University of Michigan
College of Engineering

MichiganEngineering

THE MICHIGAN DIFFERENCE

scope scholarship scale

UNIVERSITY OF MICHIGAN

College of Engineering

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"MICHIGAN ENGINEERING STUDENTS ARE THE **FIXERS, BUILDERS, INVENTORS, PROBLEM SOLVERS, EXPLORERS, INNOVATORS, RISK TAKERS, WAY FINDERS,** AND **LEADERS** OF TOMORROW. ALTHOUGH THEY MAY NOT KNOW IT YET, THEY HOLD THE ANSWERS TO SOME OF THE LARGEST QUESTIONS AND MOST SERIOUS CHALLENGES OF OUR TIME."

A WORD FROM THE DEAN

This year, once again, the College of Engineering will welcome more than 1,000 first-year students to Ann Arbor. Although I haven't met them yet, I can tell you a great deal about them.

They will come from across the United States and numerous other countries. They will be extraordinarily bright and energetic, hard-working and filled with high expectations—for themselves and the College. These students will seek a variety of experiences and desire to make an impact on the world.

Highly recruited, they will have researched their options carefully. They will have chosen Michigan—from among many other top-tier engineering programs—because they know that, here, they will have opportunities almost without limit.

Our newest students will have come in search of The Michigan Difference. They will find that difference in the form of a rare combination of stellar faculty and academic programs, world-class facilities and international endeavors, and numerous student teams, organizations and other co-curricular activities.

They will work hard and play hard. And when they leave with diplomas in hand, they will be part of a select group, ready to pursue graduate studies or successful careers not only in every branch of engineering but in law, business, medicine, higher education, government and other arenas. Moreover, they will be prepared to make a difference.

I hope you'll be among them.

This publication is intended to help you make your decision by giving you one more glimpse of Michigan Engineering—and the amazingly diverse people, programs and possibilities that create The Michigan Difference. If you have any questions or concerns after reviewing this piece, please don't hesitate to contact us.

Best regards,

Ronald Gibala
Interim Dean, College of Engineering
L.H. and F.E. Van Vlack Professor Emeritus
of Materials Science and Engineering

Faculty, students, areas of study, facilities, research opportunities, support programs, extracurricular activities, university-wide resources... by whatever measure you choose, Michigan Engineering sets the standard in diversity.

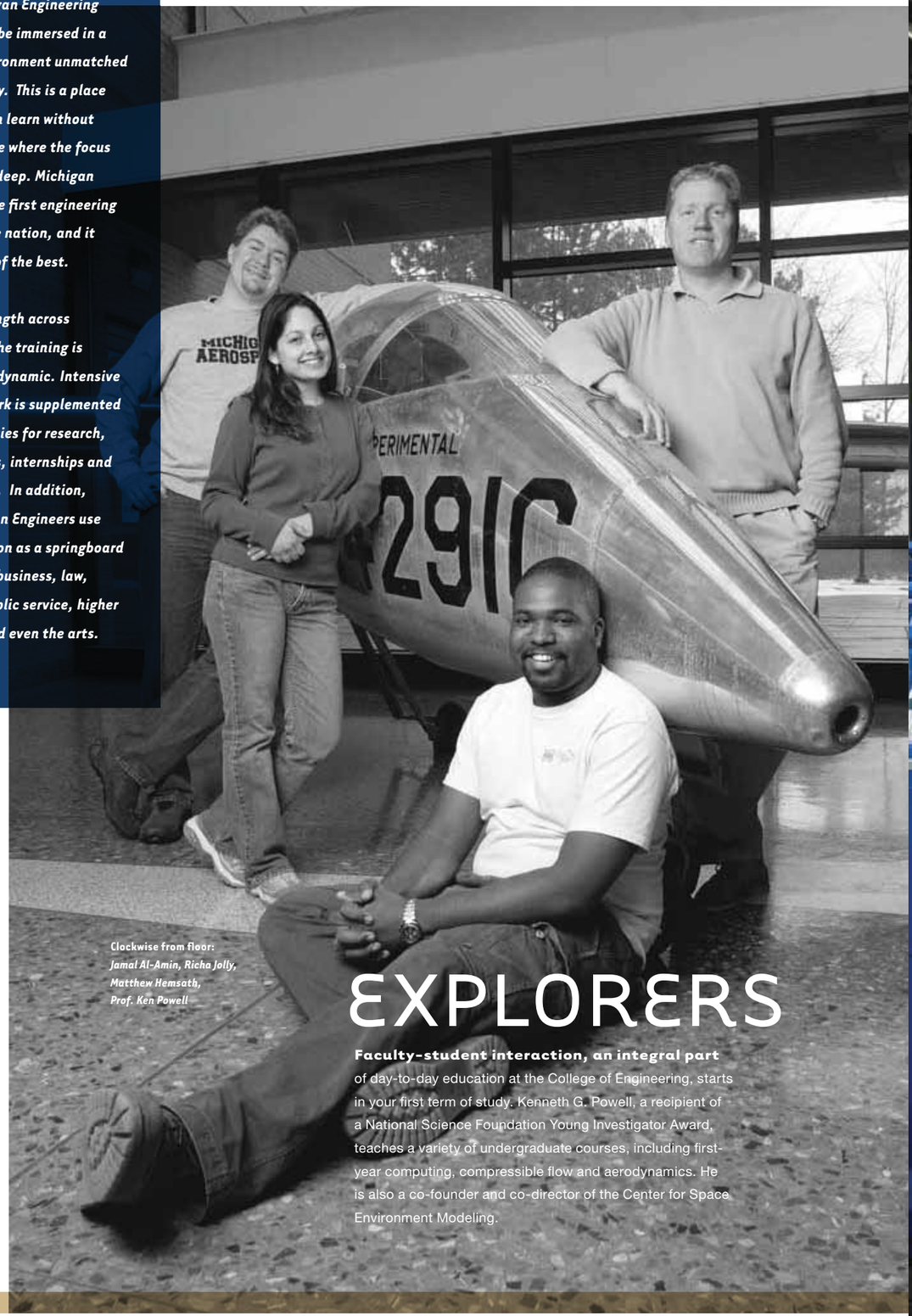
scope

Consider the resources: 300+ stellar faculty, more than 150 state-of-the-art research labs, over 80 student organizations, 10,000 engineering workstations campus-wide, 24-7 access to technology labs and studios for everything from visualization and virtual reality to digital video, design and audio production.

Consider the possibilities: dozens of opportunities to work side-by-side with faculty on research projects, guidance and support whenever you need it from advisors and mentors, 15 separate undergraduate programs of study, 52 non-engineering minors, an international alumni network more than 60,000 strong and the opportunity to live and learn within one of the world's great public universities.

To be a Michigan Engineering student is to be immersed in a learning environment unmatched in its diversity. This is a place where you can learn without limits, a place where the focus is broad and deep. Michigan was one of the first engineering schools in the nation, and it remains one of the best.

We offer strength across disciplines. The training is rigorous and dynamic. Intensive classroom work is supplemented by opportunities for research, team projects, internships and study abroad. In addition, many Michigan Engineers use their education as a springboard to careers in business, law, medicine, public service, higher education and even the arts.



Clockwise from floor: *Jamal Al-Amin, Richa Jolly, Matthew Hemsath, Prof. Ken Powell*

EXPLORERS

Faculty-student interaction, an integral part of day-to-day education at the College of Engineering, starts in your first term of study. Kenneth G. Powell, a recipient of a National Science Foundation Young Investigator Award, teaches a variety of undergraduate courses, including first-year computing, compressible flow and aerodynamics. He is also a co-founder and co-director of the Center for Space Environment Modeling.

BUILDERS

The final year for an Engineering student is exciting. Senior design projects allow students to apply theory to practice by solving problems using engineering methods. University of Michigan Transportation Services needs a Global Positioning System (GPS) to track campus bus locations. The "Magic Bus" Senior Design team is on the job. The project is a student-led prototype development effort to design, fabricate, and field test a GPS-based system for their bus fleet that will track bus locations, telemeter the location to a central server by wireless communication and distribute the information to the public (via a public web site) and to proprietary users (via a restricted access web site).

Clockwise from bottom-right: *Bryce M. Carter, peripheral integration, Jack Li, TCU (Tracking Communication Unit) power requirements and power acquisition, Pratik Doshi, TCU integration with bus systems, James Norman, TCU power requirements and wire harnesses, John Bielawski, database and web server development, Marc Allen, database and web server development, Prashanth Pandian, systems engineer (project head), lead software designer and server manager*

WAY FINDERS

Clockwise from left to right: *Brent Carr, Margarita Saieh, Jamila Grant, Bill Muscat, Stacie Meadows and Brian Reiche*

Michigan's "leaders and best" are some of the most talented students in the world. They bring their diverse skills into Engineering classrooms to create a vibrant academic environment. Because the curriculum promotes teamwork, you work closely with your peers in team assignments and study groups. Camaraderie is established through the cooperative learning process. This learning approach will serve the engineer for life.

Photo by Stefano Paltera/North American Solar Challenge

LEADERS

Some of the most valuable skills—teamwork, creative thinking, effec- tive communication and leadership—must be cultivated. Participation on one of Michigan's student project teams helps develop these skills, and the competition provides an opportunity for students to learn about careers by meeting and working with prospective employers. Each year, hundreds of students take part in major competitions by building everything from concrete canoes to human-powered submarines.

In 1989, the College of Engineering assembled the first U-M Solar Car Team to compete in the American Solar Challenge. Since then, Michigan has gone on to become the only school in the US to win four North American championships, including the 2005 title. This high-profile, collaborative project attracts students from throughout the University, who work together to design, build, test and race their creations. In 2003, Michigan's Steel Bridge Team and Offshore Design Team won national and international championships.

Team Momentum celebrates victory in the 2005 North American Solar Challenge

Photo by Stefano Paltera/North American Solar Challenge

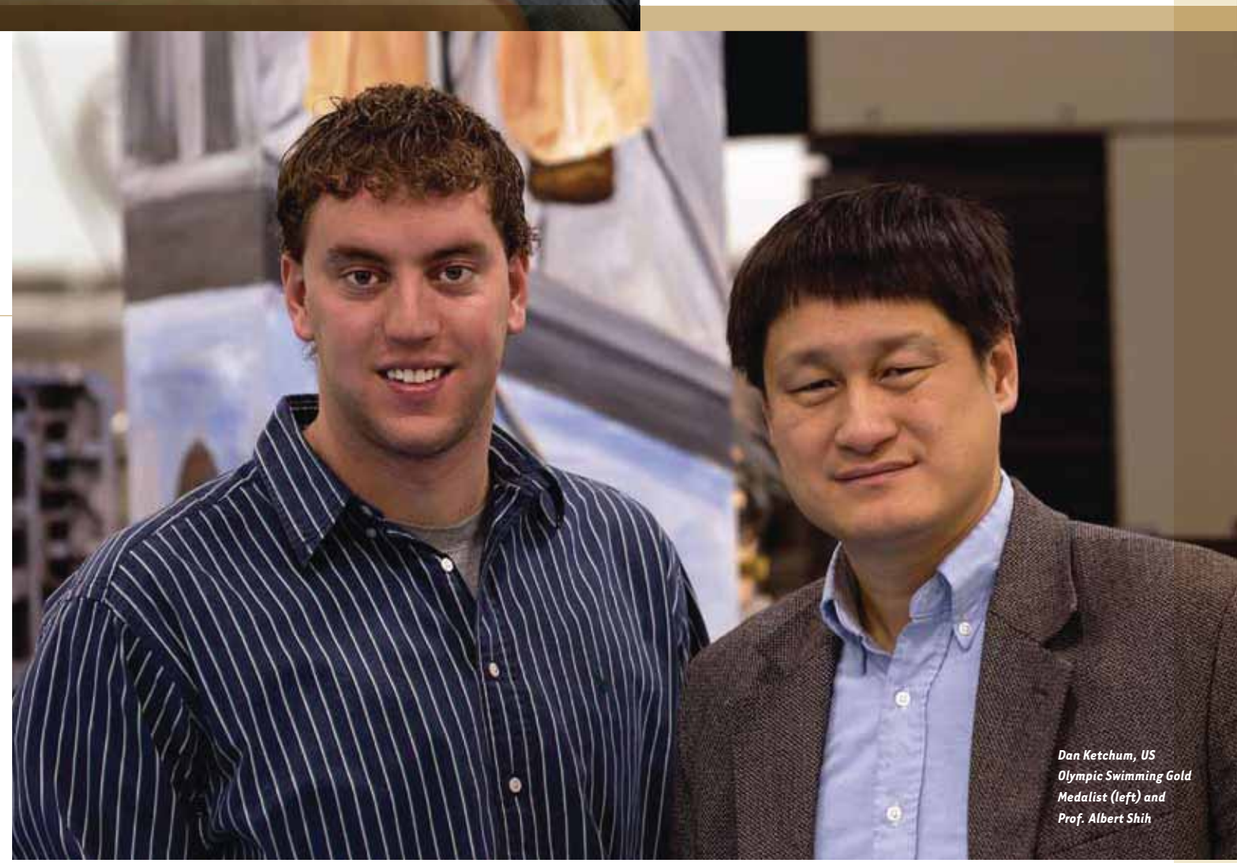
Tershia Pinder (left) and L'Rai Arthur-Mensah

MENTORS

Synonymous with Michigan Engineering is abund-dant opportunities for networking. Among these is one of primary importance: the mentor and protégé relationship.

Sometimes via structured programs, sometimes as a result of informal connections, the chance to be guided, supported, and nurtured one-on-one by someone who looks out for your academic and professional goals is invaluable. Faculty, staff, alumni and other students make exceptional mentors and enhance educational and personal success.

Dr. Susan Montgomery (left) and Tiffanique Walls



Dan Ketchum, US Olympic Swimming Gold Medalist (left) and Prof. Albert Shih

Clockwise from bottom-left: *Andrew Hurd, D. Sherrod Harrell, Carolina Sierra, Adam Finley and Gary Chia*

MOTIVATORS

The life of a Michigan Engineer includes a broad range of experiences both inside and outside of the classroom. Michigan's athletic programs are second to none. Michigan Engineers participate on both club and intramural sports teams. For some students Michigan provides the once-in-a-lifetime experience to compete on the intercollegiate level. Among Michigan Engineers you will find **Adam Finley,** an All-Big Ten second team punter; **Andrew Hurd,** U-M swimmer and 2000 and 2004 Olympian for Team Canada; **Carolina Sierra,** a U-M swimmer and NJCAA Women's Swimmer of the Year in 2003-04; and **D. Sherrod Harrell,** captain of Michigan's Men's Basketball team and recipient of U-M's 2004 Steve Grote Hustle Award. One third of Michigan's nationally acclaimed Marching Band is made up of Michigan Engineers, like clarinetist **Gary Chia,** a chemical engineering senior.

You'll find plenty of exciting outlets and opportunities around campus. As a part of the Michigan community you'll have access to world-class recreational facilities designed for volleyball, track, tennis, baseball, hockey, gymnastics, swimming, diving and a host of other activities.

4,900+
UNDERGRADUATE ENROLLMENT

19
U-M SCHOOLS AND COLLEGES

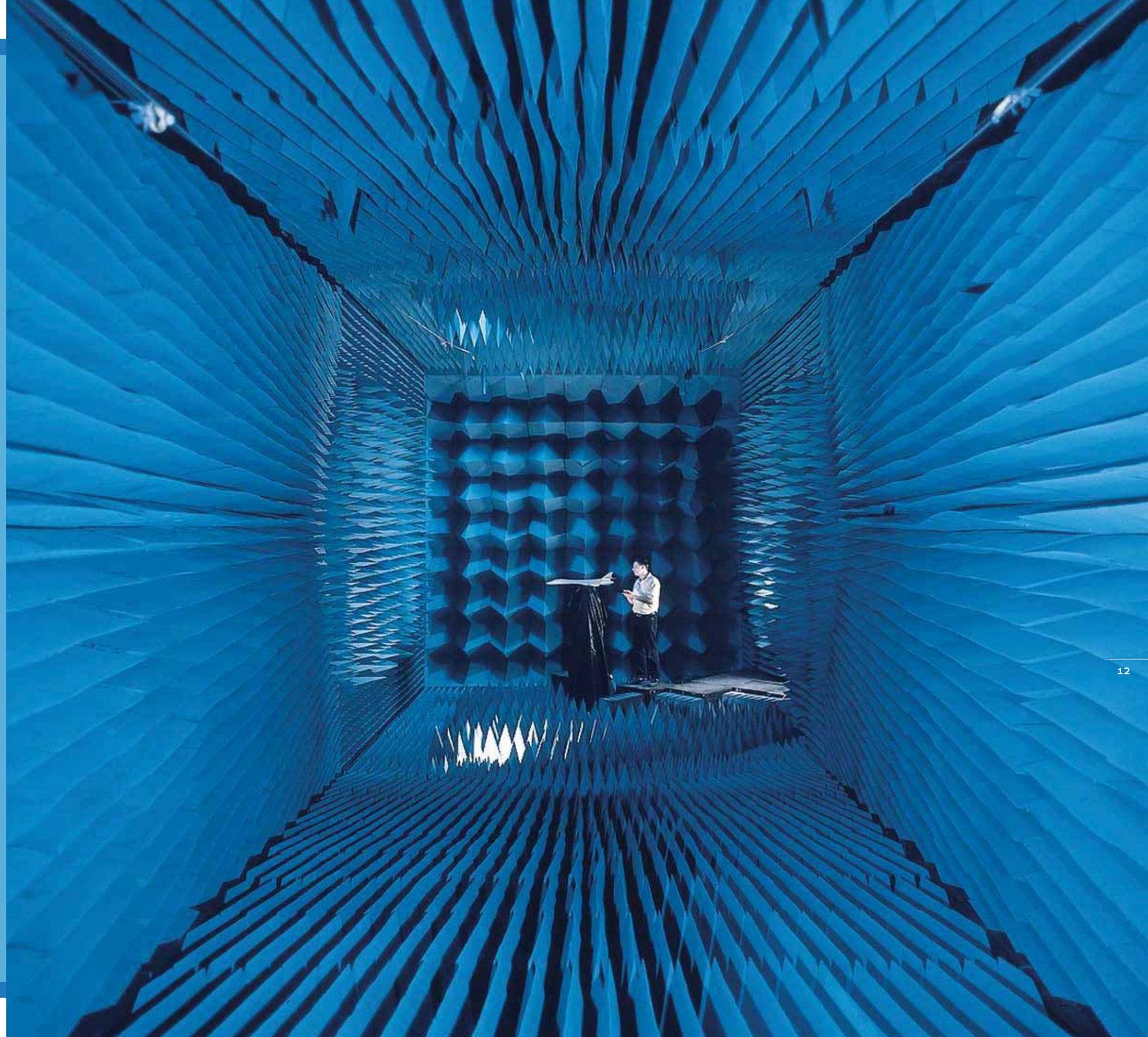
80+
ENGINEERING SOCIETIES AND PROFESSIONAL ORGANIZATIONS

8
STUDENT PROJECT TEAMS

Michigan Engineering faculty are among the most innovative scholars in their fields. Businesses, foundations and government entities from NASA to the National Institutes of Health all rely on our faculty-scholars and their students to create knowledge and solve major technological challenges.

scholarship

Each year, the faculty generate in excess of $100 million in research grants. As a result of the faculty's ongoing discoveries, the College of Engineering is home to two National Science Foundation Engineering Research Centers and many other research laboratories.



SCHOLARS

Michigan Engineering faculty are a distinguished group — dedicated teachers and acclaimed researchers who welcome the opportunity to interact with undergraduates. Here are just a few of the many outstanding faculty members who help make our programs so extraordinary, and our graduates so successful.

Professor of Chemical Engineering, **LEVI THOMPSON** is world-renowned for his research in the discovery and development of novel catalysts and reactors. He leads a large, multi-disciplinary team in the development of compact, LOW-COST HYDROGEN GENERATORS and MICRO-FUEL CELLS. These devices could be used to power portable electronics as well as cars and homes.

Mechanical Engineering Professor **DENNIS ASSANIS** devotes much of his time creating linkages from students and faculty to the automotive industry. He is the founding director of the Automotive Engineering Program. And he directs the AUTOMOTIVE RESEARCH CENTER (ARC), which recently celebrated its tenth anniversary with a $40 million research contract from the U.S. Army.

When she isn't dealing with administrative matters as associate chair of Computer Science and Engineering, Professor **MARTHA POLLACK** develops software that could eventually power computerized caregivers. These "NURSES' AIDES OF THE FUTURE," as Pollack sometimes describes them, could supplement human caregivers by automatically reminding those with memory-related illnesses to perform simple tasks and navigate their surroundings.

Professor **KENSALL WISE** is one reason why Michigan Engineering is a leader. For decades, Wise has pioneered the rapidly expanding field of MICROELECTROMECHANICAL SYSTEMS (MEMS) and WIRELESS INTEGRATED MICROSYSTEMS (WIMS). He serves as director of the Engineering Research Center for WIMS, established by the National Science Foundation.

Chemical Engineering Professor **MARK BURNS** is perhaps best known as the creator of the "LAB ON A CHIP," a microfabricated unit about the size of a penny that can perform DNA analyses quickly and economically. In recognition of his exceptional achievements, Burns received the College of Engineering's Research Excellence Award for 2003-04.

As an expert in biomechanics, musculoskeletal disorders and workplace design, Professor **DON CHAFFIN** is a consultant to more than two dozen corporations, labor groups and government agencies. Professor Chaffin is director of the LABORATORY FOR HUMAN MOTION SIMULATION (HUMOSIM), a research center that develops software tools for computer-aided work design and ergonomic analysis.

PROBLEM SOLVERS

Start with motivated, multitalented students. Give them outstanding, wide-ranging opportunities and the results are bound to be extraordinary. Here are some of the many student-scholars who are achieving great things within a great college of engineering.

Jared Pryor
FOCUS: Computer Engineering/Computer Science
RECIPIENT: 2005 Undergraduate Achievement Shipman Scholarship, Engineering Scholarship
HONORS: 2004 New Student Achievement Award, CSE Scholar
SUMMER INTERNSHIPS: Microsoft Corporation, assigned to Windows® security team on MBSA; General Electric, Specialty Lighting Division (2002 & 2004)
EXTRACURRICULAR ACTIVITIES: National Society of Black Engineers, Minority Engineering Program Office (MEPO) tutor

Tucker Berckmann
FOCUS: Computer Engineering
RESEARCH: Spent a year studying and researching at the Technical University of Munich as the recipient of the Dr. Ernst Wrede Stipend.

Wei Gu
FOCUS: Chemical Engineering/Biology
UROP SUMMER BIOMEDICAL FELLOWSHIP: Worked with Assay Designs Inc. to help develop protein analysis kits.
RESEARCH: Assisted cancer researchers at the U-M Medical School - Department of Obstetrics and Gynecology. Currently provides research support to Prof. Shuichi Takayama, U-M Biomedical Engineering, with a focus on microfluidics. Winner of the Undergraduate Prize in the 2004 Collegiate Inventors Competition.

Joanne Joy Borders
FOCUS: Computer Science Engineering
RESEARCH ASSISTANT: (Marian Sarah Parker Scholars Program) - Center for Highly Interactive Computing in Education (HiCE). Designed and wrote software program for Palm OS® computers.
INVENTIONS: Developed a software program for Palm OS® computers to strengthen spelling skills of elementary students.

Noha Elmouelhi
FOCUS: Chemical Engineering
SUMMER INTERNSHIPS: Assigned to the Products Research Division of Procter & Gamble. Worked as a software analyst with Convergys Information Management Group.
RESEARCH: Provided research assistance to Savage Research Group.

Thomas M. Rainwater II
FOCUS: Electrical Engineering
SUMMER INTERNSHIP: At Seimens AG International Group, worked with engineers from Europe, Asia, Middle East and Mexico researching steam and electric power generation, instrumentation and control industries. Helped design a control system using software still under development.
STAFF MEMBER: U-M Faculty Exploratory. Consults with faculty and staff to enhance their use of advanced technologies.

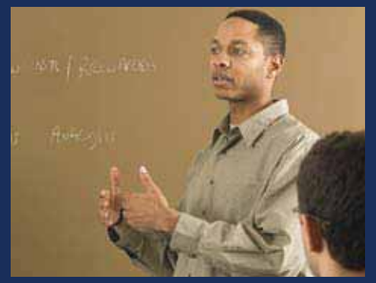
Jack Z. Li
FOCUS: Electrical Engineering/Pre-Med
RESEARCH: Worked with faculty researchers in the U-M Medical School, Biological Chemistry Department.
SUMMER INTERNSHIPS: Provided research support at the U.S. Environmental Protection Agency's National Vehicle Fuel Emissions Laboratory and the Engineering Research Center for Wireless Integrated Microsystems at the U-M College of Engineering.

INNOVATORS

The tremendous impact, scope and quality of faculty research has made Michigan an uncontested leader in various fields of engineering. Research opportunities abound for students at the College of Engineering. The concept behind the Undergraduate Research Opportunity Program (UROP) is simple but dramatic: create research partnerships between first- and second-year students and University of Michigan faculty. The program began in 1989 with 14 student/faculty research projects. Today, all of Michigan's 19 schools and colleges participate, and UROP has expanded to include approximately 900 students and 600 faculty members. For details, visit www.umich.edu/~urop.

From left to right: *Samir Shah, Jevon Gerweck, Steve Dockstader, (seated) Prof. Albert Shih, Dan Ketchum and Jonathan Urbanek*

310
TENURED AND TENURE-TRACK FACULTY



65
PATENT APPLICATIONS IN A YEAR

22
MEMBERS OF NATIONAL ACADEMIES OF ENGINEERING AND SCIENCES

11
PROGRAMS NATIONALLY RANKED IN THE TOP TEN

When you think of Michigan Engineering, think large. Very large. And think world-class as well.

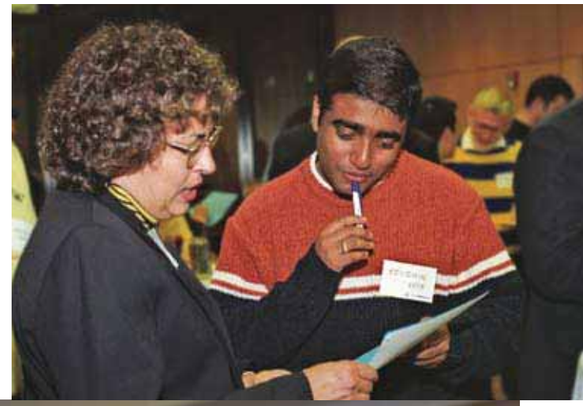
scale

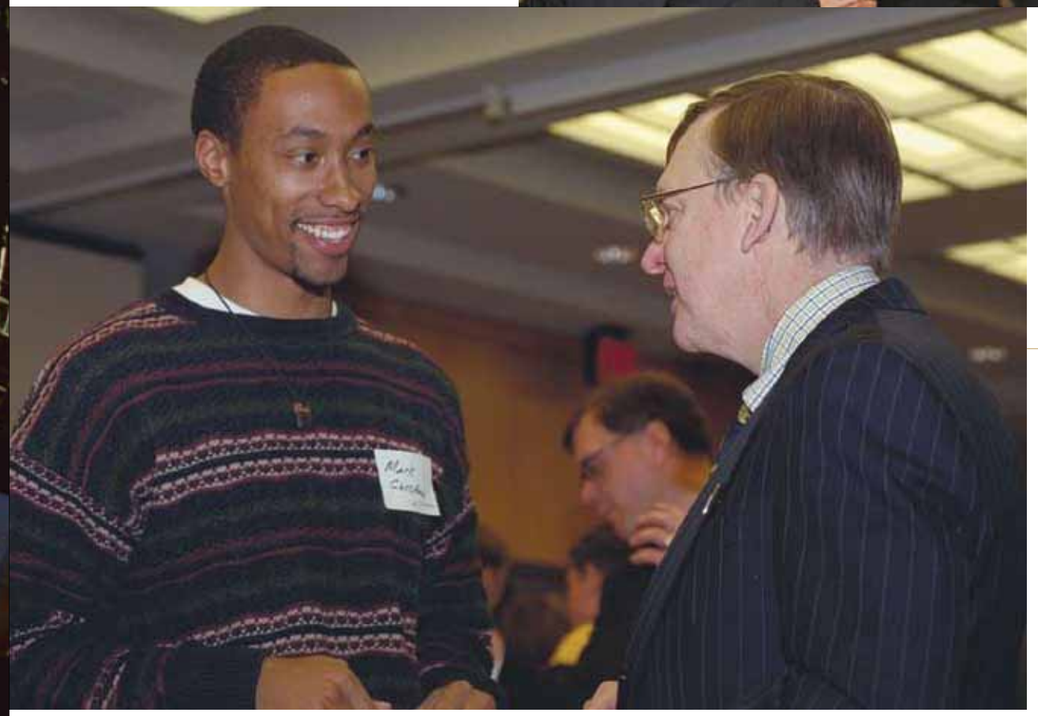
Located on the University's sprawling North Campus, the College of Engineering consists of 23 buildings, including state-of-the-art classrooms, lecture halls and laboratories. A new Computer Science and Engineering Building and the new Ann and Robert H. Lurie Biomedical Engineering Building (the second new biomedical engineering building) are impressive additions.

Also located on North Campus is the 250,000 square foot Duderstadt Center filled with interactive learning facilities, computer work areas, studios, books, specialty publications and study areas. The landscape is enhanced by some of the most dramatic outdoor sculpture you'll find on any college campus in the country.

PACE SETTERS

Helping our graduates launch successful careers—from anywhere on the globe—is a top priority, and the planning starts from day one of your first term. The Engineering Career Resource Center (ECRC) will provide you with support and information through every phase of the process. In addition to coordinating all campus interviews, ECRC offers a long list of services, including career and internship fairs, career development workshops and seminars and a Recruiter-in-Residence program.





As every student quickly discovers, the College of Engineering is a work in process. Renovations and new construction are ongoing. Classrooms and laboratories are constantly being updated and enhanced, rethought and redesigned to promote learning and discovery, and capture the latest advances in technology. The result is a dynamic environment—one that provides students and faculty with optimal venues for teaching and research.

LEGACY

CHANGING THE WORLD... ONE GRADUATE AT A TIME

Michigan Engineers are people who make a difference in our world, a major difference. Generation after generation, our graduates have gone on to achieve greatness. They have pioneered computer science and engineering developments and helped launch the digital revolution. They have guided Fortune 100 corporations and navigated spacecraft. They have created life-saving medical devices and planet-saving technologies. They have been pioneers and pace setters in everything from aviation to architecture, and from packaging to public service. Today, as in the past, Michigan Engineers are constantly making news: as CEOs and scientists, sculptors and software developers, athletes and automotive designers, entrepreneurs and experts in diverse fields of endeavor.

"[AT THE UNIVERSITY OF MICHIGAN], I HAD ACCESS TO AMAZING PEOPLE WHO WERE WILLING TO SHARE THEIR ADVICE AND EXPERTISE, AND TO HELP ME SUCCEED."

Larry Page (BSE '95)
Co-founder:
Google, Inc.

Before **Larry Page** (BSE CompE '95) came along, the Internet was a vast library where every shelf was labeled "Miscellaneous." Along with his partner, Sergey Brin, Page set out to solve that problem by creating a tool that would enable Internet users to find relevant information quickly. The result was Google, which since its debut in 1998, has become the world's most popular Internet search engine. In 2002, MIT's *Technology Review* magazine described Page as a "young innovator who will create the future." He was the first recipient of the College's Alumni Society Recent Engineering Graduate Award.

In a very real sense, **Bill Joy** (BSE CompE '75, DEng. hon. '04) made the Internet what it is today: a useful, accessible tool for research and communication. It was Joy who designed the version of UNIX, released by the University of California at Berkeley in 1984, that included a complete implementation of the TCP/IP networking protocols. Those protocols became the foundation of the Internet as we know it. Joy later went on to co-found Sun Microsystems and, in 1995, unveiled Java, another programming language of his design. Dubbed the "Edison of the Internet" by *Fortune* magazine, he currently holds 44 patents.

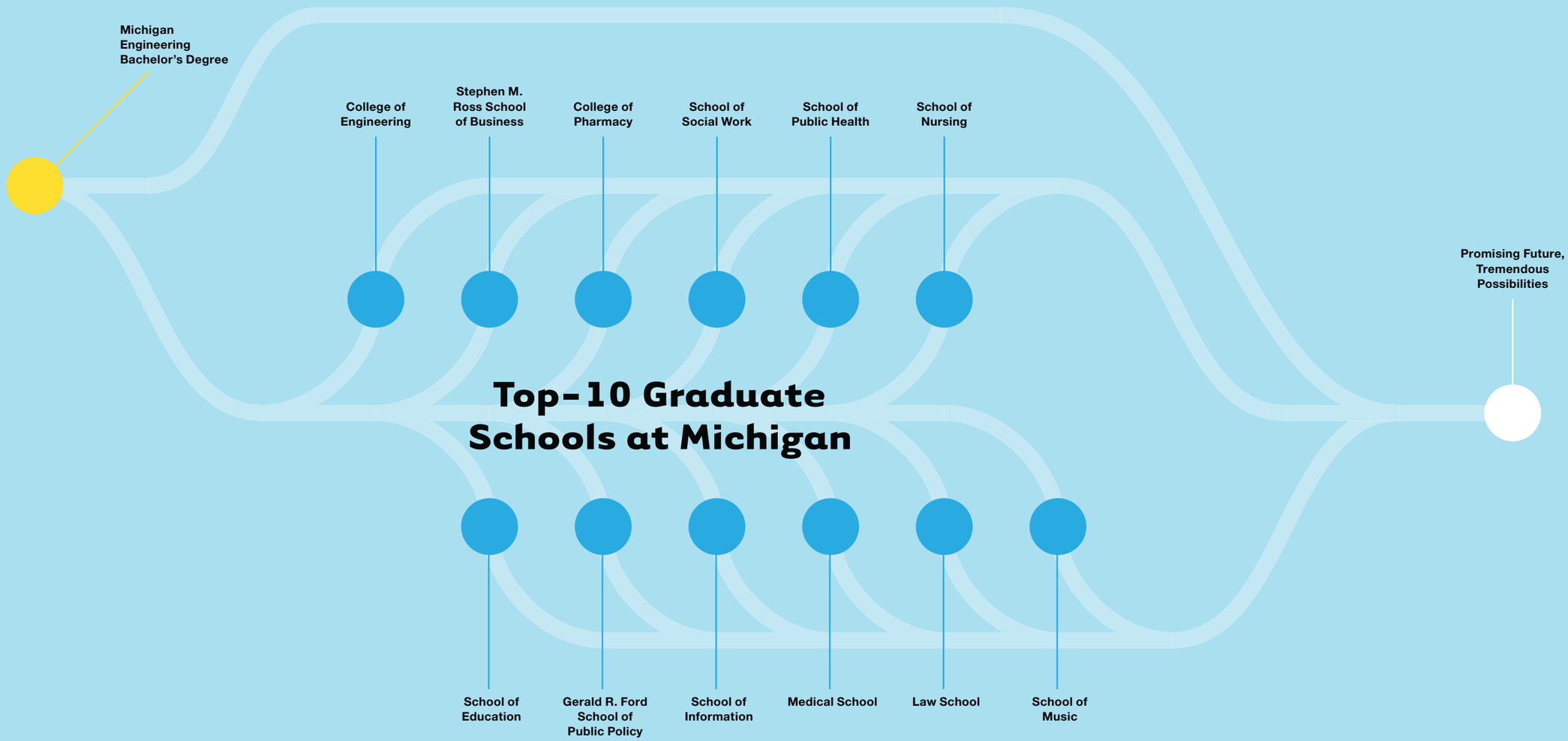
Tony Fadell (BSE CompE '91) solved a problem that perplexed music executives, lawyers and computer scientists: how to provide music to listeners while discouraging billions of free downloads. In six months in 2001, he and a team of 35 developed the iPod. Today, it is the most popular digital music player on the market. He is a recipient of the College's Alumni Society Recent Engineering Graduate Award.

Clockwise from left: *Maurice Moulton, Jennifer Szymusiak Debby Chen and Lauren Greiner*

CONNECTIONS

As a Michigan Engineering student, you'll be well connected—to the University learning community, to the wider world, and to a vast network of graduates ready to give you the benefit of their knowledge and experience.

Our 60,000 living alumni represent a huge asset for every Michigan Engineering student. Nearly 90 percent of our graduates stay connected to the College. Recent alumni can help new graduates make the transition from school to the workplace. **Maurice Moulton,** an aerospace engineering graduate and an engineer at Honda, is part of the Graduates Of the Last Decade (GOLD) Committee. **Debby Chen,** an associate engineer at Toyota Technical Center, is a recent mechanical engineering graduate. Many serve on boards and committees, or visit campus periodically for career fairs, presentations and other events. **Lauren Greiner** and **Jennifer Szymusiak** are graduating seniors who can tap into this resource in a variety of ways, including direct contact with local alumni.



LINKAGES

While many of our graduates go directly into the workplace or pursue advanced degrees in engineering, others choose to continue their education in fields such as business, law, health care, education, public policy, music or the fine arts. It's hardly surprising that so many of them enter graduate programs within the University of Michigan. After all, the U-M enjoys an international reputation as a premier center of learning.

DECISION MAKERS

Unlimited possibilities. A first-class learning environment rich in diversity. The resources to equip you for greatness. Michigan Engineering offers all of these benefits to you.

Now it's up to you. The time has come to weigh your options. Compare the strengths of various schools. And make your choice.

We invite you to become part of The Michigan Difference by enrolling in the U-M College of Engineering today.

If we can assist you in any way—by answering questions or providing more information—don't hesitate to contact our Admissions Office by phone at (734) 647-7101 or by email at rta@engin.umich.edu.