Tamera Schneider, Assistant Professor in the Department of Psychology, grew up in Englewood, Ohio, and started her college career at Sinclair Community College, where her interest in psychology began. After a year at Sinclair, Tamera transferred to Wright State University, where she earned a bachelor’s degree in psychology and a master’s degree in applied behavioral science.

Tamera’s experience in Wright State’s graduate program convinced her to pursue a career in experimental psychology. Toward that end, she left Ohio to earn a doctorate in social and health psychology from the State University of New York at Stony Brook. A postdoctoral fellowship at Yale University followed completion of Tamera’s Ph.D. program. But the call of home was strong. In September 2000, Tamera and her family returned to Dayton and Tamera accepted a position as Assistant Professor in the WSU College of Science and Mathematics.

At WSU, Tamera has taught courses in abnormal psychology, social psychology research methods, and health psychology. Other teaching interests include persuasion and emotions, positive psychology, and statistics. Her students think very highly of Tamera, as evidenced by her selection to receive the 2001-2002 CoSM Outstanding Teaching Award, an honor generated by student nominations.

Tamera is much more than a fine teacher. Her research interests include understanding the process of stress and the mechanisms of persuasion. She has examined the moderating effects of stress evaluations on psychological and physiological mechanisms that link stress and health. She also studies the best ways to persuade individuals to engage in healthy behaviors, and the psychological and physiological mechanisms that foster persuasive health appeals.

WSU President Kim Goldenberg took notice of Tamera’s promise as a young faculty member, and awarded her the prestigious President’s Award for Excellence in Early Career Achievement. Michele Wheeler, Dean of the College of Science and Mathematics, said, “She has played a major role in resurrecting the Psychology Club and Psi Chi, the national psychology honors program. Connectedness to the discipline is a major factor in student success, and I believe that Tamera has had a major impact in the psychology undergraduate program.”

Tamera Schneider has come full circle, growing from a promising young undergraduate student to a mature and productive scientist and teacher, and the College of Science and Mathematics has contributed to and benefited from her journey. We trust Tamera’s career will continue on a stellar path, bringing success and satisfaction to her, and far-reaching recognition to the university.

Steve Berberich, Associate Professor in the Department of Biochemistry and Molecular Biology, is another local success story. He earned degrees at WSU and has become a very successful researcher and educator for his alma mater. Steve attended Carroll High School and came to Wright State University, where he earned a B.S. in Biology and a Ph.D. in Biomedical Sciences. Steve credits a
Letter from the Dean

Autumn is a time of reflection, as we acknowledge the seasonal cycle of life and renewal on our planet. The academic life goes through a similar cycle of germination, growth, and reseeding. In higher education our perennial challenge is to identify and nurture intellectual talent, ensuring continuation of the cycle of learning and discovery. Many of us who chose a life of scholarship owe thanks to parents and educators for planting the seed of interest in the mystery and wonder of discovery. In conjunction with the College of Education and Human Services, the CoSM is actively engaged in providing science and math content instruction for pre-service teachers. New paradigms of content delivery emphasize inquiry over memorization and are guided by educators who share their enthusiasm for STEM (Science, Technology, Engineering, and Mathematics) disciplines with K–12 students. These teachers, who embrace the concept of discovery-based learning, demystify the scientific process for their students, providing the proper conditions for these young scientific seedlings to thrive.

It is well documented that extracurricular enrichment activities are important in cementing students’ interest in science and mathematics. Because broadening participation in science and mathematics is a national imperative, we work diligently to provide out-of-classroom science experiences such as Science Fair, TechFest, and Exploring Science. This past summer, through our participation in the Ohio Science and Engineering Alliance, we trained several minority interns in research labs; and we partnered with the College of Engineering and Computer Science to launch a bridge program that better prepares entering minority students for the rigors of college instruction. Extracurricular opportunities for undergraduates increase their self-confidence and enhance their success in STEM areas of study. Undergraduate research opportunities are widely available to our students, allowing them to work one-on-one with professors. Other enrichment opportunities for undergraduates include academic competitions and participation in student science-clubs. At the graduate level, our students perform original research guided by our resident scientists/professors. These activities provide academic fertilizer which helps our undergraduates grow intellectually and excel scientifically.

The long-term result of this intense cultivation of students is a Wright State presence in classrooms and colleges across the United States and the world. And, as you will learn in this issue of Equation, in some cases the fruit hasn’t fallen far from the WSU tree! At least two of our faculty members are Wright State graduates who began their careers in the College of Science and Mathematics and now have come full circle. As they share their love of science with students, the cycle of discovery is renewed.


cosm@wright.edu

Excellence from Within...

from p. 1

science fair project at Carroll with sparking his interest in science and specifically DNA research. Steve said he was fascinated with the scientific method and the ability to manipulate DNA. Steve’s research involves the study of genes associated with cancer. Steve is the Director of the Center for Genomic Research at WSU and was previously the Director of the Gene Expression Laboratory.

Steve chose WSU for his education and later as a base for his research because of its academic and research strength, as well as its being the place to conduct the type of work he is interested in. Steve is dedicated to his family, as well as his science in his laboratory. His wife and family in Dayton was another strong reason to stay in Dayton.

Steve enjoys his role as a mentor and emphasizes to students that science requires a strong commitment. It is more than a job, and you have to be excited about the work. “The hours are long and one must learn to deal with the roller coaster nature of the work; the good times are great but the bad times can be tough. Learning to maintain a positive outlook in spite of the emotional valleys is crucial.”

Steve is particularly proud of the students he has graduated over the years. One is already an assistant professor and another one is on track to earn that title. He has several students in the field doing research.

CoSM was one of the sponsors of the Wright State University Alumni Association Legacy Scholarship Golf outing in August, and several CoSM alumni participated, including Mike Zimmerman and Tom Hughes. The first four individuals to send an e-mail to cosm@wright.edu will be our guest at the golf outing in 2005!
New Department Chairs!

At the start of the 2004–2005 academic year, five new department chairs began their duties. The college has been and will continue to host late afternoon events to allow alumni to meet the new chairs and the college Dean.

Chris Barton

Chris Barton, Professor of Geological Sciences, comes to WSU from the U.S. Geological Survey where he served 21 years. He earned a Ph.D. in geology from Yale University. Chris is a very active researcher in the area of groundwater hydrology, mathematical scaling, and forecasting of tropical storm and hurricane winds along the eastern seaboard and Gulf of Mexico. He is a leader in the application of fractals and mathematics of non-linear systems in Earth sciences. He has held adjunct professor positions at Colorado State University, University of Nevada–Las Vegas, University of Paris, University of Alaska, and University of South Florida.

John Flach

John Flach, Professor of Psychology, is certainly not new to WSU, he has served the University for 14 years. He earned a Ph.D. (Human Experimental Psychology) from The Ohio State University. Prior to WSU, John was an assistant professor at the University of Illinois for six years, where he held joint appointments in the Department of Mechanical and Industrial Engineering, the Psychology Department, and the Institute of Aviation. John teaches both graduate and undergraduate courses in the areas of experimental cognitive psychology and human factors in addition to his research, which he performs in collaboration with the Air Force Research Laboratory at Wright-Patterson AFB as an associate research scientist. He also has close collaborations with the StudioLab and Aeronautical Engineering Department at TU Delft, The Netherlands. His research interests include general issues of coordination and control in cognitive systems; specific research topics have included visual control of locomotion, visual interface design, decision making, motor control, and dynamic tactile displays.

Dan Voss

Dan Voss, Professor of Mathematics, has served WSU for 21 years. He earned his Ph.D. from The Ohio State University. He came to WSU in 1983 in his first faculty position. He teaches a full spectrum of statistics classes from general education to graduate level. He has served the university in many capacities and at all levels, currently as the Statistics Program Director in Mathematics and Statistics, as a member of the university Faculty Senate and Senate Executive Committee, and as President of AAUP-WSU. His research interests include design and analysis of experiments; multiple comparisons; analysis of unreplicated factorial experiments; mixed models; and applied statistics. Dan has received grant support from the National Science Foundation, the Air Force Office of Scientific Research, and internal WSU sources.

Lok Lew Yan Voon

Lok Lew Yan Voon, Professor of Physics, comes to WSU from Worcester Polytechnic Institute, where he earned his Ph.D. His research is in the area of the theory of the electronic and optical properties of semiconductor nanostructures; he has 50 journal publications and dozens of presentations/talks to his credit. Lok holds visiting appointments with the Mads Clausen Institute at University of Southern Denmark, Stanford University, Hong Kong University of Science and Technology, and USAF Research Labs, and the Max Planck Institut für Festkörperforschung. He has won numerous awards including the Bäckström Award (Denmark), a National Science Foundation CAREER Award, a Sigma Xi Doctoral Research Award, and numerous others. Lok is a dedicated teacher and advisor to several undergraduate and graduate students.

Kenneth Turnbull

Ken Turnbull, Professor of Chemistry, has 24 years of service to WSU. Ken earned his Ph.D. from Heriot-Watt University in Edinburgh, Scotland. He is an outstanding teacher as shown by his numerous awards: the 1988 President’s Award for Outstanding Teaching in the College of Science and Mathematics; the 1995 and 2001 College of Science and Mathematics Award for Outstanding Teaching; and the 2002 Southwestern Ohio Council for Higher Education Award for Teaching Excellence. He has directed 45 Master’s students and 120 undergraduates over his career. He is also an active researcher in several general areas including antacids/intestinal compounds, synthetic antihypertensives, polymer supported reagents, photosensitizing compounds, non-linear optical (NLO) materials, neutrophil phospholipase D (PLD) inhibitors. Ken has served on countless Wright State committees at the department, college, and university level. His service to the community and to science is long and distinguished; for example, he has been a part of the ever-popular “Chemical Demonstration Shows” that attract thousands of middle/high-school age children to WSU.

Timothy Cope

Nationally respected researcher Timothy Cope, Ph.D., has been appointed professor and chair for the Department of Anatomy and Physiology. His research focuses on spinal cord neurophysiology, particularly the recovery of neuromuscular function after nerve and spinal cord injury. Previously a professor in the Department of Physiology and an active member of the Neuroscience Program at the Emory University School of Medicine, Cope also was a research associate for the Brain Research Institute at the University of California–Los Angeles. He has also served on committees for the National Institutes of Health and the National Institute for Neurological Disorders and Stroke.

Student Notes

Conference Honors

WSU psychology doctoral student Louise J. Rasmussen received first prize in the student paper competition at the Human Factors and Ergonomics Society's annual meeting for the Cognitive Engineering and Decision Making technical group. Her paper was titled "Task and Representation Interactions in Temporal Reasoning." She faced competition from Ohio State University, Waterloo, SUNY Buffalo, University of Central Florida, Texas A&M, University of Toronto, and the University of Michigan. Her WSU advisor is Dr. Valerie L. Shalin. Louise has completed qualifying exams and is currently working on a dissertation proposal.

Porter Fellowship Award Winner

The American Physiological Society (APS) has awarded its Porter Physiology Fellowship to historically underrepresented minorities in science since 1966 to encourage diversity among students pursuing full-time studies toward a Ph.D. in the discipline of physiology. Eight outstanding students have been awarded the one-year fellowship this year. WSU's Alfredo (Fred) Garcia III, a student in the Biomedical Sciences Ph.D. Program (Cell Biology and Physiology), is one of the eight winners who will receive an $18,000 stipend.

"This program has aimed to make careers in physiology accessible to minority students since the '60s and has been widely successful in that goal," said Dr. Martin Frank, executive director of the APS. "Former Porter fellows include a director of a NIH Institute, leaders within the National Science Foundation, and department and program heads in academic institutions.

Alumni Notes

Recently, David Nelin, Biological Sciences, was named Deputy Director of Fire Rivers Metroparks. David began as an intern in 1981 and after obtaining his WSU degree he was made the park district’s first land stewardship specialist in 1983.
Faculty News

The following faculty recently retired from WSU and the college after many years of faithful service: Patrick Campbell, Psychology; Larry Isaacs, Biological Sciences; Jane Scott, Anatomy; Bob Weisman, Associate Dean; and Tim Wood, Biological Sciences.

New Faculty

In addition to the new chairs, the following individuals are now on the faculty of the college: Sarah Tebben, Physics, Associate Professor; Stephanie Smith, Biology, Assistant Professor; Shuzia Sun, Mathematics and Statistics, Assistant Professor; and Yuqing Chen, Mathematics and Statistics, Assistant Professor.

• Congratulations to Kevin Bennett, Associate Professor of Psychology, who has been elected as a Fellow of the Human Factors and Ergonomics Society! Only 154 individuals have been honored with this high title during the 50-year history of the Human Factors and Ergonomics Society! This is in recognition of Kevin’s contributions to the society and to the field of Human Factors.

• Alexis J. Walker, the editor of the Journal of Marriage and Family, praised the work of Larry Kurdek, Professor of Psychology. Dr. Kurdek served on a committee to generate a set of guidelines regarding the rights and responsibilities of authors, reviewers, and editors.

Research Funding Update

• External research funding at WSU continues to grow. CoSM researchers were awarded over 150 grants in fiscal 2004 totaling over five million dollars. Funding comes from various government agencies and private companies.

• Thompson ISI (Citation Index, Current Contents, etc.) has picked ZnO as the dominant Emerging Research Front in all of physics for the August/September time period, and has picked one of David Look and the WSU Semiconductor Research Center’s papers as the only representative, highly cited paper for that research front. The first two international workshops, held in Dayton in 1999 and 2002, likely helped propel the field, and in the future, we can keep you informed about the special newsletter. While you’re at it, send us your e-mail—we’d like to expand the about a job or promotion, relocations, births, etc. Send us your news, where you are these days, news favorite, and WSU have been invited to present talks at five of them. This year, there have been or will be at least seven national and international ZnO workshops; David and WSU have been invited to present talks at five of them.

• Allen Burton, Professor of Biological Sciences, was recently awarded a $325,000 grant from the U.S. Environmental Protection Agency for a proposal titled, “Defining and Predicting PCB Fluxes and Their Ecological Effects in River Systems for Risk Characterizations.” The three-year grant is a collaborative project with Dr. Jianhong-Jennifer Ren of Texas A&M University, Kingsville. The project falls under the EPA’s research category involving Persistent, Bioaccumulative Chemicals.

Keep in touch!

Send us your news, where you are these days, news about a job or promotion, relocations, births, etc. We’d like to expand the Alumni/Alum section in this newsletter. While you’re at it, send us your e-mail—we’d like to create an e-mail database so that in the future, we can keep you informed about the special events and activities in the college.
On the Horizon
Alumni lunches, an alumni social event at the February 19 men’s basketball game, a celebration of the 25th anniversary of the WSU BMS program. Watch your mailbox and the college Web site for more details as they become available.

Congratulations
Congrats to Leeanne and Christine for recognizing Joyce Howes and Stacia Edwards in the last Equation. Each received an official College of Science and Mathematics shirt.

Shirts
Official CoSM sport shirts (100% cotton) are now available for purchase in a variety of colors (see http://www.wright.edu/cosm/shirts/). The shirts feature the WSU biplane logo, below it on two lines is the text Wright State University College of Science and Mathematics. These shirts are unisex sized from XS to 6XL. Shirts are $25 plus $5.00 shipping. Please allow four weeks for delivery. Call (937) 775-3203 for more information.

Awards and Recognition Day
On June 10, the CoSM held its first Awards and Recognition Day in the multi-purpose room of the Students Union. The accomplishments of students, faculty, and staff were recognized. In addition to remarks by Dean Wheatly, Provost David Hopkins spoke to the attendees. More than 20 students were present to accept their scholarship awards and nearly 25 others were recognized for their honors work (university, department of general honors). Officials said the scholarship amounts varied from $500 to more than $5,000 and included individual awards from several academic departments and scholarships named after individuals and businesses.

Three faculty members were also honored for teaching excellence. They are Glenn Dahl, a lecturer in mathematics and statistics; Eric Fossum, Ph.D., an assistant professor in chemistry; and Michael Hennesey, Ph.D., a professor of psychology. The Graduate Teaching Award for excellence in teaching went to Grady Burkett, a mathematics major. Nine retiring faculty members received a beautiful wooden chair from the college as a token of appreciation for more than 25 years of service to WSU.

Legacy for Science
When Emily Webb died at the age of 79 late in 2002, she and her husband Henry, who preceded her in death, left a legacy devoted to scientific discovery at Wright State University. Of modest means, this couple wanted to “make a mark” for their community and willed the majority of their estate, more than $850,000, to the research program of Lawrence J. Prochaska, Professor of biochemistry and molecular biology (BMB) in both the College of Science and Mathematics and School of Medicine.

Prochaska’s research focuses upon the energy and oxygen requirements of the heart and brain. “The money from the Webb’s generous gift will enable us to expand our research efforts and to try innovative approaches in our experiments,” says Prochaska. “I am most grateful for the trust and confidence the Webbs placed in me.” Dan Organisciak, professor and chair of the Department of Biochemistry and Molecular biology, adds, “Mrs. Webb was a gracious lady who visited Wright State several times and it was a pleasure to know her. I am delighted that she chose the department and the work of Dr. Prochaska in her bequest.”

Mr. and Mrs. Webb were long-time residents of Dayton, and both retired from Wright-Patterson Air Force Base after 34 years of service.

National Environmental Sciences Honor Society Started at Wright State University
A national honor society in the environmental sciences was recently founded at Wright State University. Pi Epsilon (http://www.piepsilon.org) is for undergraduate and graduate students, with 14 members comprising the first chapter at Wright State. The purpose of the society is to promote the study of environmental sciences through recognition of exemplary scholarly and professional activity. The society and its members seek to promote interdisciplinary studies and interactions between industry and academia to further the study of environmental science.

“With our strong science and engineering ties in the Miami Valley, this society is a good match for Wright State to enrich the dialogue on environmental issues within our community,” said Wayne Carmichael, Ph.D., a WSU professor of biological sciences and faculty advisor to Pi Epsilon. “Our recently established doctorate program in environmental sciences is an example of how Wright State makes our community stronger by providing students with challenging and rewarding degree opportunities,” said Carmichael, who also directs this doctorate program at Wright State. Pi Epsilon awarded the society’s first scholarship to Christina Hitchcock, an environmental health major from Dayton.

Plans call for developing additional chapters at Ohio colleges and universities in 2005, with a nationwide recruitment program to begin in 2006. Carmichael said the 14 charter members at WSU come from the U.S., China, and India and represent the multidisciplinary backgrounds of biology, chemistry, geology, engineering, and environmental sciences.
ON JUNE 10, THE COSM HELD ITS FIRST AWARDS AND RECOGNITION DAY!

Nine retiring faculty members received a beautiful wooden chair from the college as a token of appreciation for more than 25 years of service to WSU.
Message from the Physics Chair:

If you do not recall my name, it does not mean you have been gone too long. I started September 1 of this year as Chair and Professor of Physics, taking over from Dr. Gust Bambikidis. Dr. B. has served the department well, and I hope I can do at least as much.

I come to WSU after nine years as a member of the faculty at Worcester Polytechnic Institute, Massachusetts. I was educated in England, Canada, and the U.S.A. and did postdoctoral research in Germany. My research interest is in mathematical physics, particularly applied to the field of semiconductor nanostructures and acoustics.

I look forward to getting to know many of you. Should you be in the area, please drop by the department. This newsletter from the college is a great way for us to not only inform you of what is going on here but also for us to broadcast alumni news. Please do write to us!

Lok C. Lew Yan Voon, Ph.D.
Chair and Professor, Department of Physics
lok.lewyanvoon@wright.edu

The Physics Department hosted a 10-week long summer Research Experience for Undergraduates (REU) program that provided opportunities for 11 undergraduates from around the nation to participate in ongoing research at Wright State University, the Engineering Physics Department at the Air Force Institute of Technology, and the Air Force Research Laboratory. Each student was mentored by a faculty member or research scientist on a project that focused on experimental or computational aspects of basic and applied research in atomic, molecular and optical physics, chemical physics, plasma physics, solid state physics, materials science, and biological physics. At the end of the summer, each student presented a poster highlighting the research accomplished during the summer. A photo, list of students, research mentors, and poster titles are shown to the right. The program also included a series of workshops and seminars that complemented the research projects and allowed students to explore the different fields of research and discuss the educational and career opportunities in the physical sciences. Many activities were coordinated with a similar program that was hosted by the Engineering Physics Department at the Air Force Institute of Technology and funded by the Directed Energy Professionals Society. Each program was intended for undergraduates considering a career in science or engineering. Students in the WSU program were granted stipends, housing in a WSU dormitory, and assistance with travel and food expenses. This REU site was supported by a grant from the National Science Foundation in collaboration with the Department of Defense and will continue for the next two summers. For more details about this program, feel free to contact Doug Petkie at doug.petkie@wright.edu or (937) 775-3124, or visit the departmental Web site.

Physics Department Hosts an NSF/DoD Research Experience for Undergraduates Program

From left to right, starting with Name of Student (Home Institution), Research Mentor/s (Affiliation), Title of Poster.

Front Row: Ashley M. Jones (University of California at Santa Cruz), Douglas T. Petkie (Wright State University), Brian J. Drassin (Jet Propulsion Laboratory), Analysis of v9, v7, v6, and v8 Rotational Spectrum of H15NO3; Audrey Sederberg (Harvey Mudd College), Glen Perram, and Carl Druffner (AFIT Department of Engineering Physics), Optical Diagnostics for Monitoring MOCVD Deposition of Super- Conducting YBa2Ca10.7-xAl0.3-x Films; Adam Dally (University of Minnesota), Won B. Roh, Capt. Brent Grime, and 2Lt. Nathan Terry (AFIT, Department of Engineering Physics), Stimulated Raman Scattering in a Multi-mode Phosphor Doped Fiber; Mark Cross (Wright State University) and Gregory Kozlowski (Wright State University), The Future of “Small” Nanoparticles (Solution Phase Method).

Middle Row: Angela R. Blissett (University of Wisconsin-Madison) and Brent Foy (Wright State University), Stochastic Simulation of a Substrate-Enzyme Reaction; Tara White (Fort Hays State University), Won B. Roh, Capt. Brent Grime, and 2Lt. Nathan Terry (AFIT Department of Engineering Physics), Properties of an SBS Beam Produced in a Long Fiber by a CW Nd:YAG Laser; Rachel Kizbey (Scripps College) and Steven F. Adams (ARFL/PRPE), Energy Density Analysis of a Commercial Pulse Capacitor.

Back Row: Scott Little (Taylor University) and Gary Farlow (Wright State University), Computer Interfacing the Van Der Graff Generator; Eli Vishal (Carnegie Mellon University) and John Ferguson (AFRL/MLBP), Time of Flight Mobility Measurement on Conducting Polymers; John Vickers (University of Arkansas), Gregory Kozlowski (Wright State University), R. Biggers, J. Jones, R. Kerns, and T. Peterson (Air Force Research Laboratory), Epitaxial Growth of Ga0.22 Buffer Layer on Textured Nickel Substrate; Joshua Roux (Anderson University) and Jerry D. Clark (Wright State University), Low Cost Electroreflectance for High Band Gap Semiconductors.
Dr. Tebbens joined the WSU Physics faculty in September 2004. She received her undergraduate education at Vassar College in Poughkeepsie, New York. She went on to earn two master’s degrees (1989, 1991) and a Ph.D. (1994) in geophysics from Columbia University, New York. She was a member of the faculty at the University of South Florida (USF), College of Marine Science in St. Petersburg, Florida from 1994 through 2004. At USF she earned awards for her research and for excellence in teaching and mentorship at the doctoral level. She moved to the Dayton area in the summer of 2004, and is very happy to be further from the many recent hurricanes. She is currently teaching an introductory physics course (PHY 111) and is moving her research program to Wright State.

Her nonlinear research focuses on determining the scaling laws that describe forest fire areas, seamount volumes, earthquake magnitudes, fault length, fault offset, and other geophysical systems related to natural hazards. She develops simple cellular automata models to understand the geophysical processes that create the observed distributions. Ongoing research funded by NASA involves analysis of high-resolution LIDAR data to determine and quantify the pattern of shoreline change through time. Work with students has identified a nonlinear relationship between beach width and the annual amount of dune erosion. Her geophysical data analysis has been aimed at understanding the tectonic evolution of the Chile ridge and the tectonic evolution of the major mid-ocean triple junction in the southeast Pacific. These tectonic studies identify the processes involved in plate tectonic evolution over the past 30 million years. Student participation is an integral aspect of the data collection, data analysis, data interpretation, and journal publication.

Dr. Tebbens is married with two children, Nicholas (9 years old) and Kate (7 years old). Her hobbies include being a soccer mom, Girl Scout leader, hiker, triathlete, and active competitor in Taekwondo. Her favorite kitchen tool is the cuisinart.

In the last year, we hired two other new faculty in the area of Geophysics and Environmental Sciences (Drs. Allen Hunt—who was already featured in last year’s newsletter—and Sarah Tebbens). Dr. Hunt holds a joint appointment with the Department of Geological Sciences. This allows us to participate even more rigorously in the interdisciplinary Environmental Sciences Ph.D. program.

In addition to the teaching our faculty does, many are also involved in cutting-edge research and are being internationally recognized. Dr. Allen Hunt, in the past year alone, has given numerous invited talks at the University of Illinois, Urbana-Champaign, and the Canadian Geophysical Union conference in Montreal and will be giving more invited talks at the Geological Society of America National Meeting in Denver (on hydrogeology), Soil Science Society of America National Meeting in Seattle (on soil—what else?), and the American Geophysical Union Fall Meeting in San Francisco (on El Nino).

Dr. David Look, a research faculty, had his paper on a new light emitting material selected in August/September as the dominant emerging research front in physics by the prestigious publication Thompson ISI (Citation Index). He has also been invited to speak at five of seven national and international conferences after hosting two of them in 1999 and 2002. The material, zinc oxide, can be used for DVDs, laser printers, and solid-state devices.

This past summer, we hosted a 10-week long summer Research Experience for Undergraduates program that provided opportunities for 11 undergraduates from around the nation to participate in ongoing research. This program was led by Dr. Doug Petkie.

On an international note, 2005 has been proclaimed the International Year of Physics by the United Nations. It has been timed to coincide with the centennial celebration of Albert Einstein’s “miraculous year,” in 1905 when he published three seminal papers (on light quanta, Brownian motion—for which he was awarded the Nobel Prize in 1922—and the special theory of relativity). We are planning a local celebration tentatively in spring 2005 (updates will be posted on our Web site at http://www.wright.edu/academics/physics).
Geological Sciences Today: A Message from the Chair

It is with great enthusiasm for the future of the department that I became the chair seven months ago. The department is fundamentally sound but faces challenges as it evolves into an outstanding research department, strengthens its core programs, and diversifies into the broad range of fields that now constitute the earth sciences. I am confident that the department will meet these challenges as it approaches the 40th anniversary of its founding in 1966.

Alumni can play an important role in recruiting students, helping with employment needs for graduating students and for those in all stages of their careers. Over the course of my career I have observed that those who move upward are often pulled up by someone else. You may have experienced this in your own career. As you read this profile of the department as it is today, I encourage you to consider how you might help the department, our students, and your fellow alumni as we strive to move forward and upward.

Chris Barton
Chair and Professor, Geological Sciences

Department of Geological Sciences

The mission of the department is to educate our students, the region, the nation, and the world about the earth, its resources, natural hazards, and an environment now dominated by one species—humans. We fulfill our mission through the practice of earth science research by our students and faculty. The research produces a steady stream of honors theses, master’s theses, Ph.D. dissertations, journal articles, books, maps, and service on national, state, and local advisory boards.

Enrollments for 2004/2005:

B.A. 8
B.S. 15
M.S. 32
M.S.T. 26
Ph.D. 5

The Faculty: their starting year at WSU and areas of research

Abinash Agrawal, 1995
Aquifer Restoration, Environmental Geochemistry and Watershed Analysis

Christopher Barton, 2004
Statistical Quantification of Earth Science patterns, Energy Resource and Hazard Assessment

Cindy Carney, 1986
Carbonate Sedimentology, Petrology, and Diagenesis

Songlin Cheng, 1989
Hydrogeochemistry, Isotope Hydrology

David Dominic, 1987
Sedimentology, Geostratigraphic Characterization of Appalachian Aquifers

Bryan Gregor, 1972
Global Rock Cycle, General Education

Ernest Hauser, 1995
Geophysical Imaging, Ground Penetrating Radar

Allen Hunt, 2004
Quantification of Earth Processes

Robert Ritzi, 1989
Ground Water Flow and Transport, Geochemistry

William Slattery, 1994
Science Education, Sequence Stratigraphy

Sarah Tebbens, 2004
Quantification of Earth Science Patterns and Plate Tectonics

Doyle Watts, 1999
Remote Sensing and Tectonics

Retired faculty and their years at WSU:

Ken Kramer 1967–1995
Byron Kulander 1979–2003
Paul Pushkar 1968–1999
Ben Richards 1986–1999
Ron Schmidt 1970–1992
Kuri Toman 1970–1992
Paul Wolfe 1966–2003

Retired faculty can be contacted through the department office.

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Remote Sensing and Geographic Information System (GIS)

How do ecologists know the global state of earth’s rain forests? How do meteorologists track hurricanes? How do engineers and archeologists know what is just a few feet below the ground? The answer is remote sensing. Sensors in aircraft and satellites detect wave patterns and emit signals from objects on the surface of the ground. Satellites detect mineral deposits, hurricanes, toxic algae blooms in lakes and coastal areas, and crops affected by insects or drought. Doyle Watts uses remote sensing to detect trees attacked by gypsy moths. GIS is used to construct topographic maps, geologic maps, and to display any data whose location can be shown on a map. Songlin Cheng has developed two new undergraduate/graduate level courses taught at WSU’s $1 million GIS Lab.

Summer Field Camp

The department continues to operate its popular five-week central Appalachian summer field camp out of Marysville, Tennessee. The camp provides our undergraduate and master’s students, as well as students from other colleges and universities, with hands-on field experience in bedrock mapping, structural geology, sedimentology, and stratigraphy.

Petrified Wood Specimen Donated

In September 2004, the department received a gift from Brian and Marie Palmer-Smith of Washington Township, Ohio. The specimen is Araucarioxylon arizonicum, a petrified conifer from the Triassic (200–250 million years old), Chinle Formation, Arizona, and weighs approximately 2,000 pounds. The specimen has been placed along the walkway on the south side of Brehm Laboratory.

Nonlinear Geophysics

The year 2004 has seen the addition of three faculty whose research is focused on the analysis, modeling, and theory of nonlinear behavior in geophysical processes using the mathematical tools and approaches of fractals, chaos, scaling, critical phenomena, nucleation, cellular automata, and self-organizing and complex systems. The theoretical research of Alan Hunt has led to a unified theory for fluid flow, solute diffusion, electrical conductivity, and air permeability in saturated media. Sarah Tebbens studies scaling in natural systems, has developed and applied new cellular automata models, and studies the scaling of coastal change. Chris Barton focuses on the statistical quantification and forecasting of complex patterns created by natural processes including petroleum assessment, bedrock fracture networks, floods, hurricane landfalls, and shoreline position.
GEOLOGICAL SCIENCES

Geological Sciences: A 40-Year History

The discipline of geological sciences, like the petroleum industry, goes through periods of boom and bust. This department has seen major changes in academic focus and professional employment opportunities for its students. 1965–75 was the decade of plate tectonics, which revolutionized the geological sciences and is its greatest intellectual achievement. The decade 1975–85 saw a boom in petroleum exploration led by exploration geologists and geophysicists. The decade 1985–95 saw the rise of hydrology. The decade of 1995 through today marks the rise of environmental studies, biogeochemistry, computational geophysics, natural hazards, GIS, remote sensing, and LIDAR reflecting a further broadening of the earth sciences. A challenge to the geological sciences discipline across the country and to our department is to recruit high-caliber students at both the undergraduate and graduate levels. We seek the help of our alumni in recruiting the next generation of geology students.

Master in Science in Teaching Program (M.S.T.)

This hybrid program combines Earth/space science courses with courses from the College of Education and Human Services. The M.S.T. program is designed for K–12 classroom teachers and other professionals seeking to enhance their ability to teach Earth/space science. Each student completes an M.S.T. project with a faculty advisor. Enrollments have increased dramatically since 1994, when the State of Ohio mandated that Earth Science must be taught in every K–12 grade level. Under the direction of William Slaterney, the M.S.T. program has graduated approximately 150 students. The department also offers two courses for undergraduate pre-service teachers to build their knowledge of geology, oceanography, meteorology, near-Earth astronomy, and Earth system science.

Environmental Geochemistry/Geology

This program offers training in areas suited to the needs of the environmental industry. Students can concentrate their research in one of the following areas: wetland hydrogeochemistry, treatment wetlands, and environmental geophysics. Our geophysics graduates now find employment in consulting and environmental firms. Graduates continue to receive broad practical experience in the modern tools of the petroleum industry. During the past decade, near-surface or environmental geophysics has grown, and our geophysics graduates now find employment in consulting and environmental firms. Graduates continue to receive broad practical experience in the modern tools of the petroleum industry.

Environmental Science Ph.D.

The College of Science and Mathematics initiated this program in 2001. It is interdisciplinary and shared among four departments in the college (Geological Sciences, Biology, Chemistry, and Physics) and reflects the interdisciplinary nature of environmental research today. Geological science faculty are the principal advisor to five of the 12 students in the program. This program brings Ph.D.-level research to the department for the first time and opens the doors to the highest levels of research and funding.

Alumni Travel Trips

Several of our faculty are developing travel trips to regions of the world where they have conducted research. Such trips offer an educational perspective with a geological researcher as your guide. These trips are open to all WSU alumni and their friends. Accommodations and food will be three-star or better. Please contact the department office if you are interested, as the launching of these trips depends on the level of interest.

Great Barrier Reef..................................................(10 days, August 2005, Prof. Doyle Watts)

Bahamas ..........................................................(10 days, Jan. 2006, Prof. Cindy Carney)

Geology and the wines of the Finger Lake region of New York State (5 days, Summer 2005, Prof. Ernest Hauser)

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Applied Geophysics

The department has a long history of research and education dedicated to solving societal problems through the application of physics in the study and exploration of the earth and its interior. During the boom days of the oil and gas industry (1970–90), graduates of the department were highly sought and many continue to pursue successful careers in the petroleum industry. During the past decade, near-surface or environmental geophysics has grown, and our geophysics graduates now find employment in consulting and environmental firms. Graduates continue to receive broad practical experience in the modern tools of choice for the applied geophysics professional: seismic reflection and refraction, resistivity, ground penetrating radar, and LIDAR.

Hydrogeology Program

The hydrogeology program provides students with a theoretical understanding and the working knowledge required for addressing environmental problems. The program is now three decades old. Consequently, we have alumni located across the country in positions within universities, the environmental regulatory agencies, and within environmental consulting companies—including all of the national firms. Robert Ritzi continues research with David Dominici in developing better representations of stratigraphic architecture within models for groundwater flow and transport. Studies include depositional environments in Alaska (glacioluvial), New Mexico (alluvial fan), Ontario (lake shoreface), and Virginia (marine shoreface).
Message from the Biomedical Sciences Chair:

Dear Alumni and Friends:

Greetings on behalf of the Biomedical Sciences Ph.D. Program! It is a pleasure to represent this diverse, vigorous, and exciting group of students and faculty. As you can tell from this insert, there is much to make us proud. Did you know that our fully affiliated faculty now number approximately 70, our students number over 50, our alumni number over 140, external faculty funding is increasing (currently $11 million), and our students and faculty are publishing at the rate of about 140 manuscripts per year?

As we celebrate our 25th year, I want to acknowledge all the students and faculty whose hard work are responsible for the BMS Program's current success. As we look to the future, one thing is certain—we cannot stand still. We must rise to changing realities, developing new areas of investigation, and seize surging opportunities. We must continue to train students who are great today—and better tomorrow! To succeed, we are counting on your continuing support.

We look forward to seeing you in October!

Sincerely,
Gerald M. Alter, Ph.D.,
Director, Biomedical Sciences Ph.D. Program

A Passion for DNA Research and Teaching Ph.D. Students

Having been with the program since its early beginnings in 1979, it’s not surprising that Dr. Michael Leffak has graduated more BMS Ph.D. students than any other faculty member. What may be surprising, however, is how much he still loves what he does after 25 years. “I love doing science,” he said. “I love writing papers, and I enjoy seeing results 25 years. “I love doing science,” he said. “I

Dr. Leffak teaches Biochemistry and Molecular Biology, Research Ethics, and Computational Tools and Strategies. According to him, if it were not for the BMS Ph.D. Program and the outstanding students that he has had the opportunity to work with, he would not be at WSU. He has graduated a diverse group of 15 students, almost all of whom are now in research positions.

As part of the BMS Ph.D. Program, Dr. Leffak makes sure that students get a broad exposure to the field of molecular genetics. They learn to think critically about data, how to do experiments, write journal articles, and present talks. Most of the students proceed into a post-doctoral program after earning their BMS degree; this is when they really have the opportunity to define their specific research interests.

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When asked if there is a single quality that defines a student as a successful scientist, Dr. Leffak said not necessarily. “Some succeed because of their creativity, others because of the detail in their research method, and others due to their intense focus,” he explained.

DNA replication is Dr. Leffak’s current focus; his latest research involves the e-myc replication origin DNA unwinding element (DUE) and the DUE binding protein (DUE-B). Higher levels of DUE-B have been found in people with ovarian and kidney cancer, and Dr. Leffak is interested in pursuing research regarding this link. Over the years, his research has been well supported by the NIH, and he has several new funding proposals pending for research on DUE-B and its relationship to cancer.

Having grown up in New York City, Dr. Leffak attended the City College of New York, earned his Ph.D. at the City University of New York, and then did post-doctoral work at Princeton. In 1988–89, he located the chromosomal replication origin of the c-myc cancer gene. For many years, his research focused on cloning and mutating of the c-myc origin, then reintroducing it into healthy living cells to determine effects.

In addition to his research on DUE-B, Dr. Leffak is working to develop the “Families in Science” research support program. In recent years, he has noticed the change in family roles and responsibilities and the difficulty of maintaining a research laboratory during times of childrearing or family illness. The Families in Science Program would help junior faculty members who have to be away from their labs for personal or medical reasons. The funding would provide technical assistance to keep productive research going during a faculty member’s absence. Dr. Leffak feels that he is “lucky to have his career at this exact moment in time,” referring to the 1953 description of the structure of DNA and the era of molecular biology. “My entire career in science has been at the dawn of the age of molecular genetics,” he said.
BMS Graduates Working for Local DNA Analysis Company

Of the 143 BMS Ph.D. graduates, several are currently working at the Dayton location of Orchid GeneScreen: Cheryl Conley, Joy Johnson, and Debbie Baker. We’ve profiled these three individuals to highlight some of the good work that’s come out of the BMS Program.

Through its accredited laboratories in the U.S. and U.K., Orchid GeneScreen provides DNA testing services for both governmental agency and private customers to determine the parentage of a child and other familial relationships. Over the last two decades, Orchid GeneScreen has analyzed millions of samples.

Dr. Cheryl Conley, the fourth graduate of the WSU BMS Program (1984), is a Laboratory Director for Orchid GeneScreen. She reports that her Ph.D. has been extremely valuable and was a requirement for her current position, which involves all scientific aspects of identity testing. She has used her degree to move into clinical areas and appreciates the diversity of training the WSU program included.

After earning her Ph.D., Dr. Conley completed her postdoctoral work at the University of Louisville, where she was a NASA Fellow studying the effects of weightlessness on immune response. While working as an Assistant Professor of Medical Technology at the University of Louisville, she established a bone marrow transplant program. Here in Dayton, she started an accredited HLA typing program at GeneScreen and the tissue bank at the community tissue services provider.

Twenty years after obtaining her Ph.D., Dr. Conley still gets excited about new discoveries and new areas of scientific exploration. She also gets excited about encouraging young adults to pursue biomedical sciences. “I look at science analytically, like a puzzle,” she said. “How can we solve this problem in the most efficient way?”

Dr. Joy Johnson, the 52nd graduate of the WSU BMS Program (1987), reviews data for Orchid GeneScreen. She is thankful that the WSU program at GeneScreen and the tissue bank at Dayton, she started an accredited HLA typing program at GeneScreen and the tissue bank at the community tissue services provider.

When asked what the most exciting aspects of her job are, Dr. Baker responded “trying out new technology and problem solving.”

Dr. Johnson loves kids and feels that her job is about “putting families together” by obtaining financial support from a father or confirming the status of siblings and other relations.

Dr. Debbie Baker, the 61st graduate of the WSU BMS Program (1992), also works at Orchid GeneScreen. She values her BMS Ph.D. because it prepared her for her career and gives her a deeper understanding of her work.

Recent Academic Graduates

**Brena S. Mauck**
- Graduated: 1998
- Area of Concentration: Cell Biology & Physiology
- Director: Dr. Robert Grubbs
- Thesis: Effect of Prenylpropane Bonds and Stress on Neuronal Apoptosis and Membrane Receptor Densities in C57/Bl Mice
- Position: Postdoctoral Fellow, University of Kansas

**Kenneth Gagnon**
- Graduated: 1998
- Area of Concentration: Cell Biology & Physiology
- Director: Dr. Peter K. Lusis
- Thesis: Localization and Functional Properties of KCC1 and KCC2, Two Inhibitory Ion Channels of the Mammalian Central Nervous System
- Position: Postdoctoral Fellow, Vanderbilt University

**Emma T. Lavoie**
- Graduated: 1998
- Area of Concentration: Immunology
- Director: Dr. Keith Graham
- Thesis: Immunoreactivity of Organochlorine Contaminants in Juvenile Chickens and Fish Eating Birds from the Great Lakes
- Position: Faculty Research Ass., Univ. of Maryland

**Jing Zhang**
- Graduated: March 2004
- Area of Concentration: Cell Biology & Physiology
- Director: Dr. Norma Adragna-Lauf
- Thesis: Regulation of K+ Channels in primary cultures of VSMCs by growth factors
- Position: Postdoctoral Fellow, National Institute of Health

**John Casper**
- Graduated: 1993
- Area of Concentration: Molecular Biology/ Biochemistry
- Director: Dr. I. Michael Leffak
- Thesis: The Role of DNA Unwinding in Protein-DNA Interactions in the Intermediary Program
- Position: Postdoctoral Fellow, Medical College of Ohio

**Elizabeth Muennich**
- Graduated: 1993
- Area of Concentration: Molecular Biology/ Biochemistry
- Director: Dr. Robert L. Fields
- Thesis: The Distribution and Membrane Organization of K21 Subunit-Containing Vesicles in Membranes of the Mammalian Spinal Motoneuron
- Position: Resident Physician, Kettering Medical Center

**Jonathan Nuss**
- Graduated: 1993
- Area of Concentration: Molecular Biology/Biochemistry
- Director: Dr. Gerald M. Alter
- Thesis: Prediction of the Structure of Replication Protein A
- Position: Bates Kumpfer Scholar, University of Texas Medical Branch

**Beth Kuczynski**
- Graduated: 1993
- Area of Concentration: Molecular Biology/Biochemistry
- Director: Dr. Nicholas Rex
- Thesis: The Effect of Myo-inositol and Ethanolamine Phosphatidylethanolamine Plasmalogen and Its Potential Role as an Inositol Antagonist
- Position: Postdoctoral Fellow, The Ohio State University

**Marc Greenberg (Ph.D. student under Dr. Allen Burton), senior research associate in the Institute for Environmental Quality, has received the 2004 Roy F. Weston Environmental Chemistry Award from the Society for Environmental Toxicology and Chemistry (SETAC). The award was presented during the opening events at the Fourth SETAC World Congress and 25th Annual Meeting on November 14, 2004.**

This award is made annually to honor Roy F. Weston, founder of Roy F. Weston, Inc. The award is designed to encourage the advancement of environmental problem solving and to encourage the professional development of young scientists in the field of environmental chemistry. To this end, the award is given to a scientist under the age of 40 for contributions made to the field of environmental chemistry. The award, which is announced each year at the SETAC North America Annual Meeting, is in the form of $1,000 to support the cost of the recipient to attend the SETAC Annual Meeting.

**ENVIRONMENTAL CHEMISTRY AWARD**

**AWARDS**

**DISTINCTIONS:**

Join us in congratulating these BMS Ph.D. students on the following awards and distinctions:

**Poster Awards:**
- Fred Garcia (regional)
- Jon Nuss (local)

**Graduate Student Excellence Award:**
- Carol Mercer

**First Dual Degree Student:**
- Elizabeth Muennich (MD/Ph.D.)

**Pre-doctoral Fellow:**
- Ryan Geyer, American Heart Association Postgraduate Fellow
- Fred Garcia, American Heart Association Postgraduate Fellow

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Biology Department faculty at their 2004 Retreat

Message from the Biological Sciences Chair:

The Department has completed another exciting year. In the past 12 months, we have graduated approximately 125 Biology majors. A dozen graduate students completed master’s degrees and went on to jobs as technicians, to Ph.D. programs, to medical school, and to residency programs (and five had weddings, two of them to each other!). One member of the faculty—Don Cipollini—was granted tenure, and Stephanie Smith joined as a new faculty member. The faculty received more than a million dollars in external funding for research, published more than three dozen research articles in scholarly journals, and made nearly 75 presentations at professional conferences. We edited publications, consulted on environmental projects and court cases, organized meetings, and reviewed grant proposals. Teaching, research, and service; these are the three prongs of a university career, and these are the daily enterprise of the Biology faculty.

Now it is a stimulating time of year at a university, and thoughts turn to the diverse items of business ahead. This year, those items promise to be exciting indeed, with faculty hiring and planning for renovation high on the priority list. However, as we look forward to new people and improved space, we are excited, too, to engage the input, experience, and expertise of our alumni. So let us hear from you: visit our home page and tell us your latest: www.wright.edu/biology/alumni.

Changing Faces in the Department

Tim Wood retired in 2004 after more than 30 years with the Department of Biological Sciences. Tim truly enjoys people, and this was clear in the classroom. His courses, ranging from General Education (which he completely redesigned) to Invertebrate Zoology to the Marine Field Trip, were always popular, and just this past year this culminated in Tim’s recognition as the Kegreiss Distinguished Professor of Teaching. Tim’s research interests were also diverse, with substantial efforts directed in two main areas. For many years Tim worked to improve the efficiency of fuelwood use in developing countries, an important effort toward improving lives and conserving forests. Tim is also a leading expert on the biology of freshwater bryozoa (the world’s most beautiful animals, Tim will tell you), and he continues to make fundamental discoveries about these “moss animals.” Throughout, Tim has maintained a love of travel—by daily bicycle commute when in Dayton (more than 5,000 total trips, he has calculated), and to distant and often obscure corners of the world for his research. Tim will continue with aspects of his research in retirement, particularly with studies of bryozoa in Thailand, so we look forward to his animated updates on work and travel. But we will miss his daily contributions to the life of the department and the university.

Larry Isaacs also retired in 2004. Larry spent 25 years at Wright State, first in the College of Education and Human Services, and then, for his last 10 years, in the Department of Biological Sciences. During these 10 years Larry, along with Bobbie Pohlman, established the curriculum in exercise biology. His commitment to providing students with solid preparation for careers in physical therapy, cardiac rehabilitation, and other areas of human biology is evident in the scientific rigor of that program. Larry’s research training was in exercise physiology, and he specialized in the kinesiology of sports. Larry worked with diverse populations, from children to the disabled to professional tennis players. His textbook on motor development, now in its 5th edition, is the top-selling textbook in its field. Larry has now returned to his roots, heading for the warmer climate of South Carolina. We wish him well.

Stephanie Smith joined the Department during the 2004 summer. Stephanie received her Ph.D. in 2002 from Ohio State, where she studied the biochemistry of the enzyme ribulose-1,5-bisphosphate carboxylase/oxygenase (“RubisCO”). RubisCO is a fundamental player in plant and microbial photosynthesis (remember carbon fixation and the Calvin cycle?) and is often cited as the most abundant protein on Earth. Stephanie explored the relation between variations in sequence of this protein and its enzymatic efficiency and kinetic properties. After earning her doctorate, Stephanie remained in Columbus at the Battelle Memorial Institute, a nonprofit contract research company, where she pursued biotechnological applications of her expertise in microbial genetics and enzymology. Stephanie brings diverse strengths (and a sharp sense of humor) to our program in microbiology. She also brings a real enthusiasm for teaching and in her first year will offer courses ranging from introductory Biology of Disease to an upper-level course in Virology. We take great pleasure in welcoming Stephanie to the department.

News from Clinical Laboratory Science

The Clinical Laboratory Science program is happy to report on the successes of recent graduates. Erin Kelly and Anthony Polito (2002) have presented thesis defenses this fall for their M.S. degrees in Pharmacology/Toxicology from Wright State, and Heather Inbody (2000) has successfully completed her Physician’s Assistant program at the Medical College of Ohio, graduating at the top of her class! Eleven full-time students and one part-time student completed the CLS program in June 2004, and they are now working in Dayton, Cleveland, Oxford, Cincinnati, Kentucky and Indiana. To date, six of these graduates have taken the national Board of Registry and all have passed. Congratulations!
Focus on Research: Wayne Carmichael

Dr. Wayne Carmichael joined Wright State’s Biology Department in 1976, one of several positions made available by faculty moving to the newly created medical school. Dr. Carmichael has been named Wright State’s Bruce Gilding Distinguished Professor of Research, and he is currently Director of the Environmental Sciences Ph.D. Program.

Blue-green algae, also called cyanobacteria, are photosynthetic bacteria. These organisms play a major role as primary producers in freshwater and marine aquatic ecosystems. However, many people know them best from their periodic “blooms” of productivity in fresh water (“pond scum”), which occur particularly in nutrient-rich waters brought about by extensive use of fertilizers and from industrial and municipal waste. In recent years, these blooms have become notorious as health hazards to people, domestic animals, pets, and wildlife. Indeed, they have acquired their own acronym, HABs, for “harmful algal blooms.” The reason that HABs are such a hazard is that, in addition to fixing carbon in photosynthesis, many cyanobacteria also synthesize potent toxins. Ingestion of toxic cyanobacteria can lead to symptoms ranging from liver dysfunction to neural paralysis and even death.

Professor Wayne Carmichael has studied these toxic algae for more than 30 years. As quoted from his 1994 article in Scientific American, his work combines a “fascination with the microscope and things microscopic” with “the question of how—naturally produced poisons—damage the body.” Dr. Carmichael’s research combines aspects of microbiology, plant physiology, pharmacology, toxicology, and natural products chemistry. In his laboratory, Dr. Carmichael maintains cultures of many species and strains of cyanobacteria. From these algae he has been able to isolate, identify, and provide a classification scheme for numerous novel toxins. Just as “botox,” the toxic product of the botulinum bacterium, finds applications in biomedicine, so too can algal toxins prove useful in research and technology. For example, the microcystins (cyclic peptides) act by inhibiting protein phosphatase enzymes, and they present a potent tool for studying these ubiquitous regulatory proteins as well as for the study of certain cancers. Thus, Dr. Carmichael produces, isolates, and distributes cyanobacterial biochemicals to laboratories and biotechnology companies world-wide.

Dr. Carmichael has been called in as an expert for a diversity of purposes. In Brazil, he was able to identify the algal toxins that contaminated the water supply of a kidney dialysis clinic and led to the death of more than 70 patients. In 2005, Dr. Carmichael testified before a U.S. House congressional panel seeking to define legislation for priorities and funding to study and prevent HABs, including those of toxic cyanobacteria.

Wayne Carmichael’s work has also led to collaborative projects in more than 20 countries on every major continent. His work has led to a better understanding of the consequences of water pollution and to recognition of the negative health effects of toxic cyanobacteria. In the U.S., his work has been supported by NSF, NIH, EPA, TVA, CDC, USGS, the Army Corp of Engineers, and over 50 state and local agencies. Internationally, he has worked on these problems for WHO, UNESCO, NATO, and AID. His scientific publications include more than 350 papers, reports, book chapters, and presentations. More information on Carmichael’s research and teaching is available at: http://biology.wright.edu/faculty/carmichael/labhome.htm.