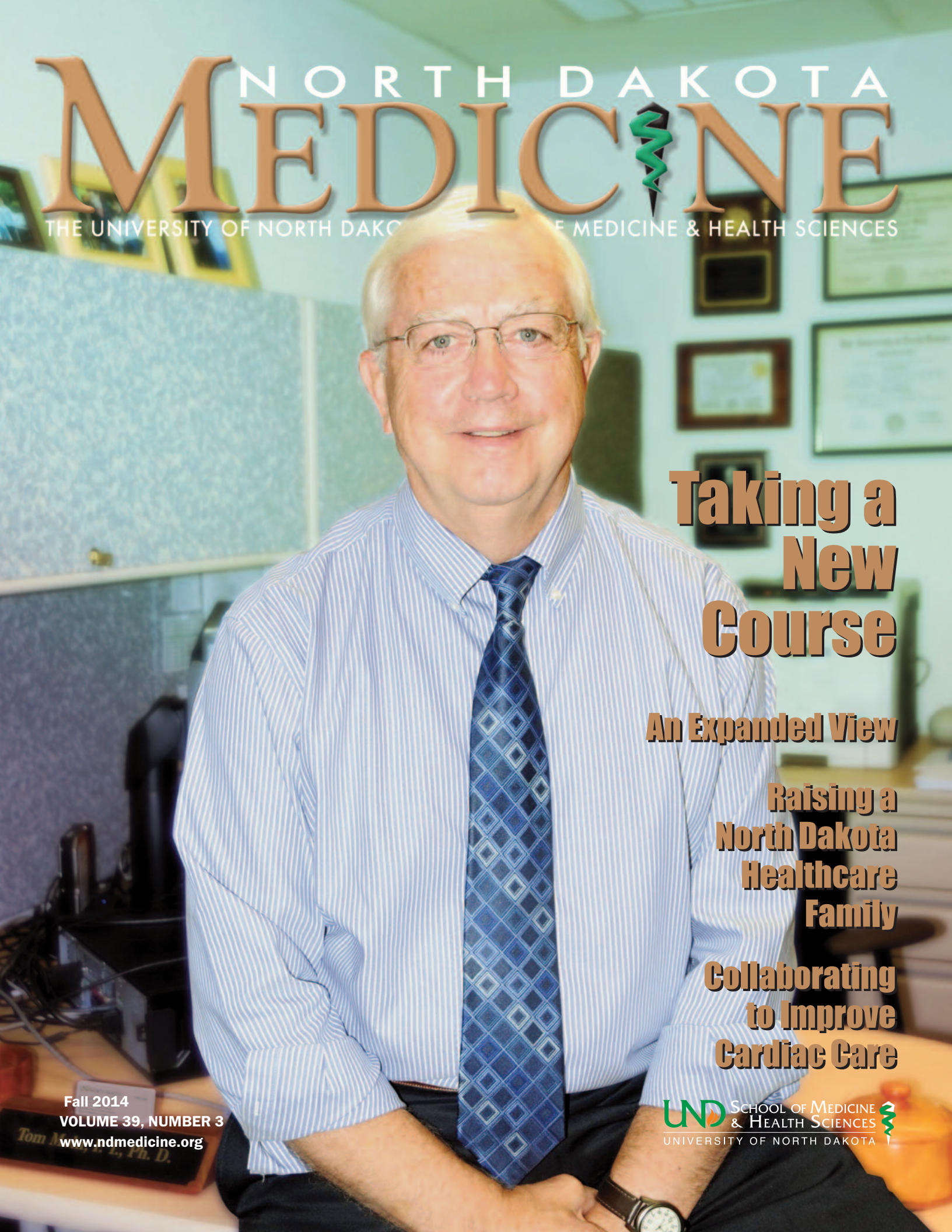

NORTH DAKOTA MEDICINE

THE UNIVERSITY OF NORTH DAKOTA MEDICINE & HEALTH SCIENCES

Taking a New Course

An Expanded View

Raising a North Dakota Healthcare Family

Collaborating to Improve Cardiac Care

Fall 2014
VOLUME 39, NUMBER 3
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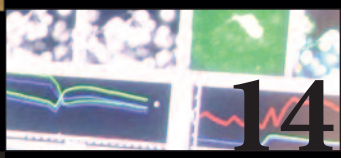

UNIVERSITY OF NORTH DAKOTA
SCHOOL OF MEDICINE AND HEALTH SCIENCES

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NORTH DAKOTA MEDICINE

THE UNIVERSITY OF NORTH DAKOTA SCHOOL OF MEDICINE & HEALTH SCIENCES

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Steady as She Goes!

> We are making a number of changes. But have no fear—the School is on course, and **headed in the right direction!**

While a nautical phrase may not be completely appropriate in North Dakota, it does describe the School's status during this time of intense change. To help better position the School for the future and maximize our effectiveness in addressing our primary goals of educating the healthcare workforce for North Dakota, discovering new knowledge to improve the lives of North Dakotans, and serving the entire community of North Dakota, we are making a number of changes. But have no fear—the School is on course, and headed in the right direction!

From a facility standpoint, the direction we're headed is north. The new building is rising from the ground a few blocks north of the current building, and is progressing well—and on budget! We anticipate that the doors will open in July 2016, just in time to greet the incoming medical school class of 2020. As I talk about the building to people around the state, there is great interest in and support for the eight novel learning communities that are an integral component of the new facilities. These communities will provide the physical space to house our interprofessional teaching and learning efforts, where we will have various members of the healthcare delivery team—medical students, nurses, physical therapists, speech therapists, et al.—working together while in school as they learn from and teach each other.

The class size expansion that is part of the Healthcare Workforce Initiative (HWI) is progressing nicely. The just-started first-year medical school class is composed of 78 students, the largest class size in UND history! That's up from 62 students a short three years ago, a 26 percent increase. And the health sciences departments (that educate other healthcare providers like occupational therapy and physician assistant students) have increased their class size by a total of 30 students per year. Importantly, we also are adding residency (post-MD clinical training required for state licensure) slots. North Dakota has already added residency training slots for rural family medicine, rural surgery, and hospitalist practice, and additional new programs recently were approved for obstetrics and gynecology, rural psychiatry (that will highlight the use of telemedicine to deliver care in rural regions), an additional rural family medicine experience, and a one-year geriatrics fellowship.

Partly as a consequence of the class size expansion and partly as a consequence of the School's growth and maturation, we have a variety of recruitment activities in

full swing. We have active searches underway for at least six new senior-level faculty members, in addition to the recruitment we do throughout the year because of faculty turnover and retirement; we hope to recruit three additional members for the School's leadership team, and three faculty members. The leadership positions include the following:

- Chair, Department of Population Health—The new department will give an academic home to the various faculty members at the SMHS who are interested in population and public health issues, including those in the Center for Rural Health and the Master of Public Health Program.
- Associate Dean of Medicine—A new faculty position that will help coordinate the clinical and teaching activities of our clinical medical departments (i.e., internal medicine, family medicine, surgery, psychiatry (clinical neuroscience), pediatrics, OB-GYN, radiology, and pathology). One major impetus for this new position is the feedback that we received from our medical accrediting body, the Liaison Committee on Medical Education (LCME). One major citation from the LCME focused on our distributed governance structure, with much autonomy and flexibility given to the regional campus deans and clinical department chairs. While I think that there is little doubt that our organizational model works well as evidenced by our successful students—excellent, high-quality graduates—it's clear that we'll need to tighten up the central control and oversight provided by the School. Hence, the need for this new position.
- Dr. David and Lola Rognlie Monson Endowed Professorship in Medical Education—A new faculty position to provide the leadership and pedagogical expertise to augment our educational programs school-wide.

Because the educational enterprise is the primary focus of the School's purpose (along with discovery and service to the community), we have been thinking about other ways to take our already outstanding programs to an exceptional level, in addition to the new Monson professorship, which is being made possible by a generous endowment from David and Lola Monson. Our own Dr. Gwen Halaas will lead the School's educational enterprise, and her title has been changed to the senior associate dean for education; the Monson professor will report to her. The former Office of Medical Education has been renamed Education Resources (ER) to emphasize that the function of the unit is to provide support and assistance to the teaching faculty school-wide. And I'm very pleased that Dr. Pat Carr has assumed the leadership of ER as its inaugural director.

So steady as she goes does accurately characterize the current status of the School. There are many projects underway, and some of them may cause choppy seas, especially as we make some necessary changes. But we are aware of where the shoals are, and the course that we've charted is judicious and should ensure a safe passage. So full steam ahead!

Joshua Wynne, MD, MBA, MPH
UND Vice President for Health Affairs
and Dean

UND scientists find another way bacteria needle us

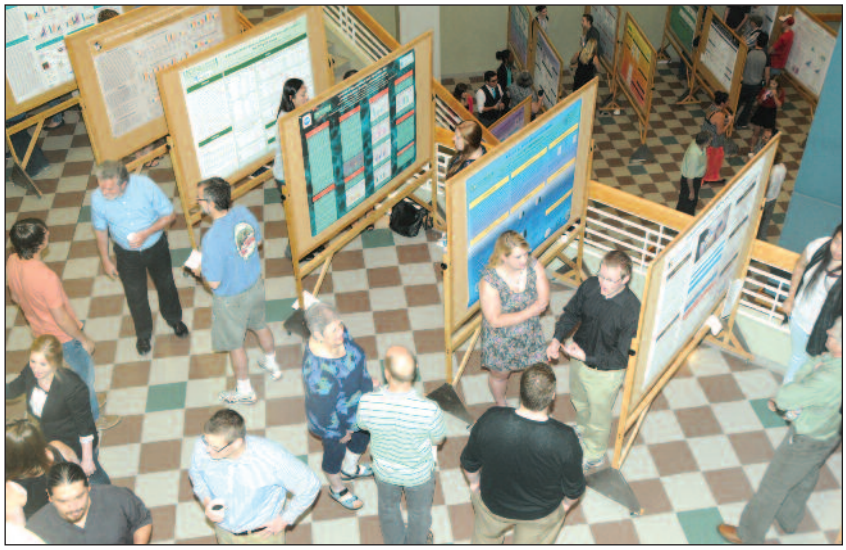
A University of North Dakota research team, led by Associate Professor Matthew Nilles, PhD; Assistant Professor Danielle Jessen, PhD; and Associate Professor David Bradley, PhD, in the Department of Basic Sciences at the School of Medicine and Health Sciences, reported they have discovered that a molecular "needle" found on the surface of a group of bacteria signals the body's immune system it is under attack by a virulent family of bacteria that includes the flea-borne pest that causes the plague and other bacteria that are the culprits in contaminated food and produce that cause mild to severe cases of diarrhea or dysentery.

For more information, please read more at http://tinyurl.com/q7myn6l.

Danielle Jessen, Matthew Nilles, and David Bradley

UND summer undergraduate students present biomedical research

Fifty-seven undergraduates presented the results of their labors this summer at the University of North Dakota School of Medicine and Health Sciences 2014 Summer Undergraduate Research Experience poster session on August 7 in the Vennes Atrium of the School. For 10 weeks, students from UND, as well as rural and tribal colleges in Minnesota, North Dakota, and across the nation conducted research and participated in a number of related educational opportunities. Students participated, shoulder-to-shoulder, with their mentor scientists from the UND Department of Biology, the UND SMHS Departments of Pathology and Basic Sciences, and the UND SMHS Center for Rural Health.



Funding for the students came from a variety of organizations, including the National Institutes of Health, National Science Foundation, U.S. Department of Health and Human Services, and the Office of the Dean at the UND School of Medicine and Health Sciences.

The students conducted biomedical research with scientists whose work has implications in the areas of neurological disease, cancer, diabetes, drug addiction, heart disease, and aging.

In addition to the University of North Dakota, this year's participants are from Cankdeska Cikana Community College, Fort Totten, N.D.; Turtle Mountain Community College, Belcourt, N.D.; Bay Path College, Longmeadow, Maine; Central Michigan University, Mount Pleasant, Mich.; McCook Community College, McCook, Neb.; Mississippi Valley State University, Itta Bena, Miss.; Peru State College, Peru, Neb.; St. Mary's University, San Antonio, Texas; and the University of Arizona, Tucson.

For a list of the students and their hometowns, please read more at http://tinyurl.com/p48oml2.

SMHS inducts Gold Humanism Honor Society members

Pictured, left to right, are Amanda Blanchard; Associate Dean Nicholas Neumann, MD; Jessica Corean; Kirk Bjella; Elizabeth Gray; Joshua Johnson; Bethany Kaemingk; Craig Meiers, Emily Lenz; Amanda Peterson; Andrew Mills; Associate Dean Charles Christianson, MD; Rural Medicine Clerkship Director Roger Schauer, MD; and Director of ND STAR Simulation Center, Year-2 Clinical Skills, and Director of SIM-ND Jon Allen, MD.

Ten medical students from the Medical Doctor Class of 2015 at the University of North Dakota School of Medicine and Health Sciences were inducted into the Gold Humanism Honor Society.

Roger Schauer, MD, associate professor in the Department of Family and Community Medicine, and rural medicine clerkship director, was inducted into the society as a faculty member.

Limited to fifteen percent of the senior class, the Class of 2015 inductees were selected through a process that included peer nomination and subsequent confirmation by the School's Gold Humanism Honor Society Oversight Committee. Each student's clinical performance and record of community service was considered.

Honorees from the Class of 2015, and their hometowns, are the following individuals:

- *Kirk Bjella*, Bismarck, N.Dak.
- *Amanda Blanchard*, Dickinson, N.Dak.
- *Jessica Corean*, Hettinger, N.Dak.
- *Elizabeth Gray*, Fargo, N.Dak.
- *Joshua Johnson*, Mandan, N.Dak.
- *Bethany Kaemingk*, Albert Lea, Minn.
- *Emily Lenz*, Duluth, Minn.
- *Craig Meiers*, Minot, N.Dak.
- *Andrew Mills*, Bottineau, N.Dak.
- *Amanda Peterson*, Valley City, N.Dak.

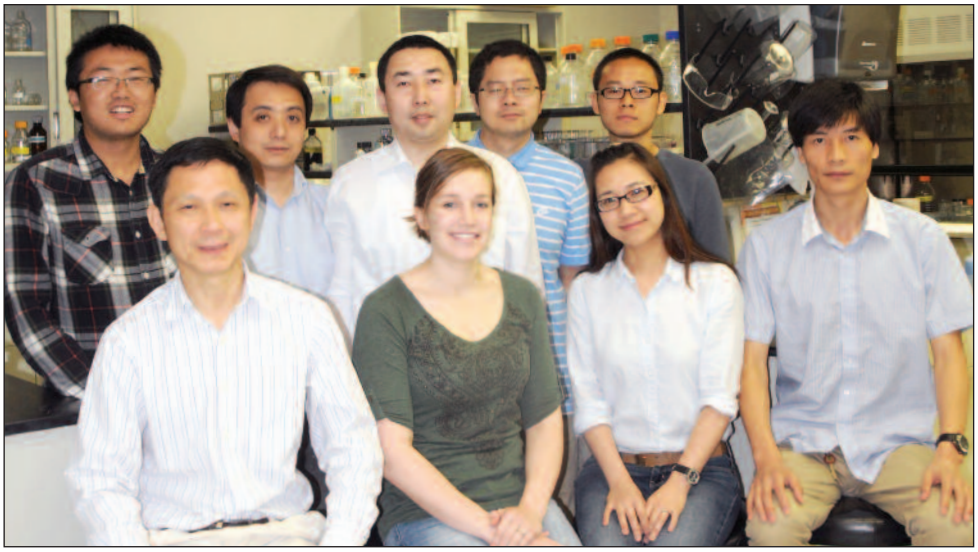
For more information, please read more at http://tinyurl.com/nucpemc.

NIH grants $1.7 million to UND scientist to study unique defense against superbug infections

A University of North Dakota School of Medicine and Health Sciences scientist has received a $1.7 million, five-year R01 grant from the National Institutes of Health to study a unique defense against superbug infections.

The National Institute of Allergy and Infectious Diseases of the NIH recognized the promising research being conducted by Associate Professor Min Wu, MD, PhD, in the Department of Basic Sciences at the UND School of Medicine and Health Sciences, by awarding him the grant.

For more information, please read more at http://tinyurl.com/p7ear9e.



Pictured left to right, front row: Min Wu, MD, PhD; Alec Hildenbrand, second-year medical student participating in the Research Experience for Medical Students Program; Yan Ye, graduate student; and Xuefeng Li, graduate student. Back row: Shirui Tan, graduate student; Qiang Guo, MD, PhD; Rongpeng Li, PhD; Shuang Zhang, PhD; and Changpei Gan, graduate student.

Rural North Dakota hospitals named among Top 20 in the nation

Three rural critical access hospitals (CAHs) in North Dakota have been named among the twenty highest-ranked CAHs in the nation, as determined by iVantage Health Analytics. The awards were announced by the National Rural Health Association.

Carrington Health Center, West River Health Services in Hettinger, and St. Andrew's Health Center in Bottineau were recipients of this honor. The determining factors for the Top Twenty CAHs were based on ten indicators of strength, including quality of care provided, patient outcomes, and financial stability.

For more information, please read more at http://tinyurl.com/o4pmw3s.

NIH grants $16.8 million to UND biomedical scientist, continuing heavy investment in sound biomedical research

The National Institutes of Health granted $16.8 million to Professor Donald Sens, PhD, in the Department of Pathology at the University of North Dakota School of Medicine and Health Sciences. The five-year grant renews the NIH's longstanding investment in the work by Sens that began in 2001.

For more information, please read more at http://tinyurl.com/lmtdt9f.

Donald Sens

Awards honor rural and public health providers

Rural and public health providers, volunteers, and organizations were recognized with awards at the 2014 Dakota Conference on Rural and Public Health's annual banquet.

The Dakota Conference is a joint effort by Altru Health System of Grand Forks; the North Dakota Public Health Association; the North Dakota Rural Health Association; the UND College of Nursing and Professional Disciplines; and the UND Center for Rural Health.

For more information, please read more at http://tinyurl.com/opka7pr.

Gray voted as president-elect of the American Psychological Association's Division 45


Jacqueline S. Gray

Jacqueline S. Gray, PhD, associate director at the Center for Rural Health at the University of North Dakota School of Medicine and Health Sciences, has been voted as president-elect of the American Psychological Association's Division 45 for the 2015 term.

Division 45 of the American Psychological Association is the Society for the Psychological Study of Culture, Race, and Ethnicity.

For more information, please read more at http://tinyurl.com/kg4gmq2.

NIH grants $1.6 million to UND scientists for study of HIV-1/AIDS neurological complications


Jonathan Geiger


Xuesong Chen

The National Institutes of Health granted $1.6 million to Chester Fritz Distinguished Professor Jonathan Geiger, PhD, and his colleague and collaborator Assistant Professor Xuesong Chen, MD, PhD, in the Department of Basic Sciences at the University of North Dakota School of Medicine and Health Sciences. The five-year R01 grant from the NIH's National Institute of Mental Health funds research on some very new, novel and potentially important mechanisms that control levels of intracellular calcium in neurons that may explain neurological complications associated with HIV-1/AIDS.

For more information, please read more at http://tinyurl.com/nakbbo7.

Pictured at the left are the Dakota Conference on Rural and Public Health 2014 award recipients. Front row, left to right, Dr. Hubert Seiler, Trisha Jungels, and United Tribes Technical College Wellness Circle members Pat Aune, Sue Kahler, and Wanda Agnew. Back row, left to right, Dani Schell, Dr. Mark Strand, Theresa Will, Penny Hamilton, Caleb Behm, and Ivan Mitchell.

Murphy to serve as the faculty adviser on State Board of Higher Education


Eric Murphy

The State Board of Higher Education added three new members. Governor Jack Dalrymple appointed Kevin Melicher and Christopher McEwen to fill the two vacant voting positions on the board.

Eric Murphy, PhD, was elected by the Council of College Faculties to serve as the faculty adviser on the board. His one-year term will run through June 30, 2015.

Murphy is an associate professor with tenure in the Department of Basic Sciences at the University of North Dakota. In addition to his work at UND, he is also the editor-in-chief of *Lipids*, a journal of the American Oil Chemists' Society, as well as the chief scientific officer and executive vice president for research and development for biotechnology company Agragen, LLC and its subsidiary, Unicrop, OY, located in Finland. Murphy holds a bachelor's degree from Hastings College and a PhD from Ohio State University.

For the complete North Dakota University System press release, please read more at http://tinyurl.com/qdrhatg.

Medical laboratory science students receive scholarships for 2014—2015

The University of North Dakota School of Medicine and Health Sciences awarded scholarships to medical laboratory science students at the School. Funds for the scholarships are given from various private sources, endowments, and scholarship funds.

- *Amanda Stevens* of Valley City, N. Dak., received the Jean Holland Saumur Hematology Award for achieving the highest grade in hematology in the fall semester of 2013.
- *Mallory Custer* of Baldwin, Wisc.; *Heather Howatt* of Devils Lake, N. Dak.; and *Brandon Johnson* of Lino Lakes, Minn., each received the Ralph and Hazel Rohde Medical Technology Scholarship Award, which is given each year to UND senior medical laboratory science students who have shown academic excellence.
- *Brandon Johnson* also received the Miltza Luper Scholarship Award, which is given each year to a UND medical laboratory science student who demonstrated outstanding accomplishments in the subject of biochemistry and molecular biology.
- *Mary Kading* of Coon Rapids, Minn., received the Dr. Cyril J. Dillenburg Memorial Medical Scholarship, which is given annually to a full-time senior medical laboratory science student at Altru Hospital in Grand Forks.
- *Stephanie Gellner* of Langdon, N. Dak., received the Eileen Simonson Nelson Pathology Award. This award goes to the medical laboratory science student who receives the highest grade in the MLS 101 course in the fall semester of 2013.

For more information, please read more at http://tinyurl.com/m52v8pd.

Taking a New Course

Tom Mohr's and David Relling's new roles will help to lead the School in the new era of healthcare education.

By Juan Pedraza

Tom Mohr already has put a fair dent into a successful career in healthcare.

Enough time, some would reckon, that he could justifiably call it a day. In fact, he recently relinquished the chair of the Department of Physical Therapy, which he had headed for 21 years following his 15 years of teaching.

But the energetic Mohr, ever enthusiastic about teaching the next generation, isn't giving up just yet.

Just about as quickly as he closed the door on his old office, he opened a new one at the UND School of Medicine and Health Sciences.

The Chester Fritz Distinguished Professor of Physical Therapy was recently named as associate dean for health sciences, a new position at the School, by UND Vice President for Health Affairs and SMHS Dean Joshua Wynne.

"Tom was ready for a new challenge after doing an exceptional job as PT chair for 21 years," Wynne said in press release announcing the appointment. "Having Tom take on the role of associate dean for health sciences means that the School's largest group now has one of its own leading all of the health sciences programs."

This appointment represents a major, positive shift for the School of Medicine and Health Sciences—and it signals UND's enthusiastic leadership in a new era in medical and health sciences education.

"We wanted to have the health sciences organized in a cohesive and cooperative way," said Wynne, a cardiologist, noting that there are 2½ times more health sciences students than medical students. "Before this, the health sciences already were used to working together very collaboratively and also with the medical school faculty. This new structure formalizes that internal relationship."

Wynne said Mohr had earlier expressed an interest in moving on from physical therapy.

"He was the logical candidate to head up the health sciences group," said Wynne. "So now he's the associate dean for health sciences. We're doing a similar thing on the medical curriculum side. We're recruiting for an associate dean for medicine. That person will lead the clinical departments and our regional campus deans also will report to that person."

Mohr's new position as associate dean is part of a broader move by Wynne to create a much more collaborative medical and health science education and bioscience research enterprise.

"We're going to have several enterprise-wide deans," Wynne said. "Dr. Gwen Halaas has a new title and a new role as senior associate dean for education. As education is the foundation of the institution, Dr. Halaas will intersect with the associate dean for medicine, the associate dean for health sciences, and the chair of the Department of Basic Sciences. She will help support, direct, and collaborate with the educational activities in every area of the SMHS. It's an integrative approach to medical and healthcare education."

Wynne says that interprofessional education—such as that envisioned in Mohr's new role—is a key for the future of healthcare in the state and in the country.

"It's about having people from different disciplines, different specialties and professions working together, because that way they can best practice together in the future," Wynne said.

The new organization reflects the state's Healthcare Workforce Initiative, which has four major components:

- Reduce disease burden.
- Retain more of our graduates for practice in North Dakota.
- Train more healthcare professionals, that is, increase class sizes.
- Increase the efficiency and the effectiveness of the healthcare delivery system.

"We're an educational institution, so we don't do a lot of healthcare delivery—we mainly educate people," Wynne said. "So the best way we think we can improve the efficiency of the delivery of healthcare is through these interprofessional healthcare teams. We believe that approach will lead to greater patient satisfaction, higher quality of care from less duplication of services, and better coordinated care, and, therefore, lower costs."

But, Wynne and Mohr note, you cannot practice integrated, collaborative team approaches unless you learn how to do it.

"We think learning how to do this, from the first day of school, is critical," Wynne said. "We're a leader in this—other schools are doing it, of course, but we have a unique opportunity, with the new building, of bringing all of our students together in one of the eight learning communities. The new building is specifically designed for learning communities. Here we're designing the space that will support our approach to education."

Mohr, who joined the PT faculty in 1978, served as chair of the Department of Physical Therapy since 1993. He earned his bachelor's in physical therapy from UND, a master's in physical therapy from the University of Minnesota; and a doctoral degree in physiology from UND. His ongoing research interests are neuroscience, biomechanics, electromyography, and motion analysis. Mohr has served as a member of the Board of Directors of the Federation of State Boards of Physical Therapy and the North Dakota Board of Physical Therapy.

In his new job, he'll oversee the departments and programs of physical therapy, occupational therapy, physician assistant studies, and medical laboratory science, and will coordinate with sports

> "He was the **logical candidate** to head up the health sciences group."

medicine. He'll also keep a full teaching load.

Dave Relling, chair, Physical Therapy

Dave Relling, a physical therapist and University of North Dakota alum, recently took over as chair of the physical therapy program at the School of Medicine and Health Sciences.

Relling is only the third chair since the department was founded by Bud Wessman in 1967. Thomas Mohr recently stepped down as chair after 21 years.

A native of Dilworth, Minn., Relling completed his BSPT at UND in 1991, his Master of Science in Kinesiology at Kansas State University, and he earned a PhD in Physiology with an emphasis in cardiovascular physiology from UND in 2003. His role as chair will include teaching, which he is passionate about.

"I first became interested in physical therapy as a result of a leg injury in high school football," he said. "A physical therapist helped to reduce the swelling and pain from the significant bruising and helped improve the function of my leg—then I was able to return to the sport. That was my first experience with PT."

"After that, I was able to do some observation of PTs, and I worked weekends at the medical center rehabilitation hospital—now part of Altru Health System—in Grand Forks as an aide, and I started to understand the benefits, the opportunities, and the life-changing impact of PT," Relling said.

After graduation from UND, Relling worked for a couple of years at the same facility where he'd been an aide, then joined the UND PT faculty part-time in 1996 while maintaining a half-time position as a clinician.

"The next year, I applied for a full-time position and got it," Relling said. "I was able to transfer clinical skills into the classroom, and I found that I really enjoyed teaching."

He takes over a program that has seen significant changes since he got his bachelor's degree in physical therapy.

"This biggest change is in the education and training of physical therapists," said Relling, noting that changes are national in scope. Today, all of the country's 225 accredited physical therapy programs offer a Doctor of Physical Therapy degree (a clinical doctorate).

At UND, which opens 52 slots annually in its DPT program, the program runs about six years from freshman year to graduation.

"We have 200 to 250 qualified applicants on average for every class," he said. "That competition means we get very talented, highly motivated students in our program."

Students complete three years of undergraduate education then apply to the DPT program, which takes another three years to collect the professional degree. UND does not require a bachelor's degree for admittance to the DPT degree program, although applicants must demonstrate a depth and breadth of college courses within a discipline.

"After their first year in the DPT program, students have the opportunity to obtain a Bachelor of General Studies with a sub-plan in Health Studies," Relling said.

Medical school advantage

UND's Doctor of Physical Therapy program is part of the School of Medicine and Health Sciences.

"For us, the largest advantage of that is access to the other health science programs," Relling said. "There's a strong interprofessional component in the education of physical therapists here at UND. Among other things, our students take an interprofessional healthcare course, which brings them together with other health professions such as speech language pathology, medicine, occupational therapy, physician assistant, social work, nursing, and music therapy—that's a large group that mirrors healthcare systems where the students will eventually be employed."

"The other thing that is modeled for the students at the SMHS is that health sciences faculty and medical faculty interact, and students can see that model in action," Relling said. "They carry that over into their clinical practice."

Another benefit is access to resources, such as the human cadavers and anatomy facilities that are essential to the training of physical therapists.

The class each year comprises a cohort of 52 students—including two slots

reserved for INMED students. Each new class spends its first year all on campus, fall through the following summer.

"The students are taking courses in clinical sciences, basic sciences, and they're learning the hands-on techniques of examination, evaluation, and intervention," Relling said. "In their second year, they begin to go out into clinical sites for two nine-week clinical education experiences in different facilities around the country under the supervision of a licensed physical therapist. These clinical experiences are essential for students to apply their new knowledge and skills. We really appreciate the clinical instructors and sites that provide students with this important opportunity."

After they complete the fall semester of their clinical experiences, they come back to Grand Forks, usually to start a scholarly project plus advanced courses in evidence-based practice, imaging, and pharmacology during the spring and summer session of the second year.

In their third year, students complete advanced neuro-rehabilitation, differential diagnosis, and manual therapy courses in the fall semester and then finish with two more nine-week clinical rotations

"So they end with 36 weeks full-time in the clinical setting under the supervision of a licensed physical therapist," Relling said. "It's an exciting profession with lots of opportunities. There is a strong demand for PTs in healthcare."

"And the opportunities aren't just in the healthcare system," Relling noted. "Physical therapists today have an excellent background in evaluating movement, exercise prescription, and in improving performance, all of which enhance life and health well beyond clinical rehabilitation. So there are many opportunities for DPTs in wellness and health."

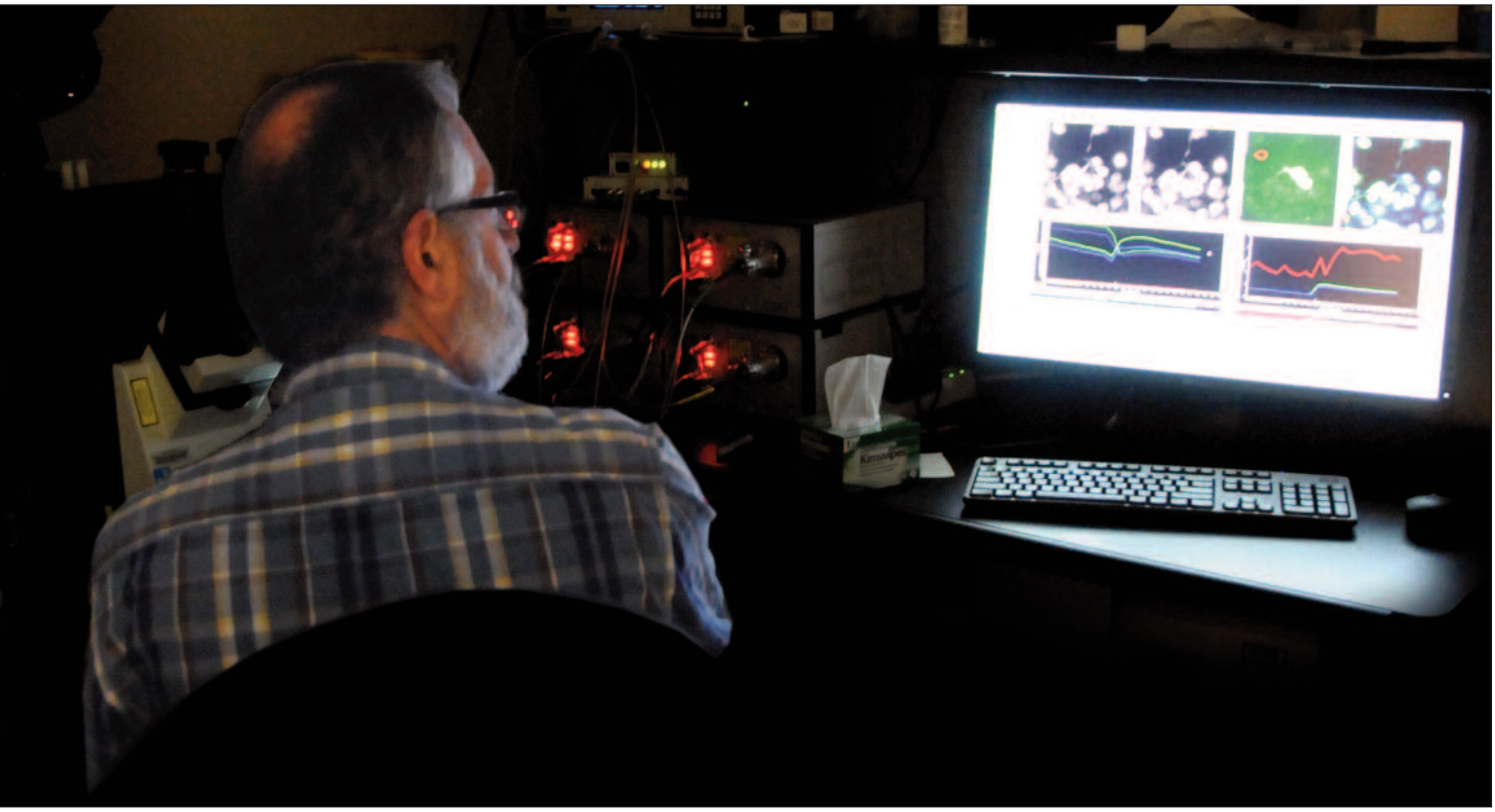
Relling is currently president of the North Dakota Board of Physical Therapy and is on the board of directors for the Federation of State Boards of Physical Therapy. His research interests include exercise physiology, biomechanics, orthopedics, and educational methods.

> "The other thing that is modeled for the students at the SMHS is that **health sciences faculty and medical faculty interact**, and students can see that model in action. They carry that over into their clinical practice."

An Expanded View

The Edward C. Carlson Imaging and Image Analysis Core Facility opens windows to cellular processes for SMHS researchers.

By Juan Pedraza



Bryon Grove views images obtained from the Carlson Imaging Facility.

Today, bioscientists at the University of North Dakota School of Medicine and Health Sciences can view cellular activity—and many other phenomena in life systems—in sharp molecular detail in the Edward C. Carlson Imaging and Image Analysis Core Facility.

"This is a comprehensive core facility that offers our researchers and students access to advanced microscopy resources," said Bryon Grove, director of the imaging facility and himself a cell biologist with an intracellular signaling research program that makes good use of the facility.

It's named after Edward Carlson, longtime chair—now semiretired but actively teaching and researching—of the former UND SMHS Department of Anatomy and Cell Biology and vital supporter of advanced microscopy at the School, Grove said.

The flood of 1997 damaged the microscopy facility and several of its key instruments. A grant from the Federal Emergency Management Agency allowed the SMHS to purchase new electron microscopes, the first confocal microscope, and other more advanced technology to significantly enhance the utility of the lab to researchers.

"In 2002 we submitted our first NIH COBRE [Center of Biomedical Research Excellence] grant; we were funded, and we acquired a second confocal microscope, a Zeiss 510 META confocal microscope, which further increased our capabilities,"

Grove said. "With that money, we also renovated our light microscopy facility and hired a part-time technician." Since then, the grant has been renewed twice under the leadership of Chester Fritz Distinguished Professor Jonathan Geiger, PhD, and continues to support the core facility.

Though the imaging facility primarily was designed, funded, and built to support the UND SMHS research enterprise, Grove said the facility also encourages researchers in other departments and at other educational and research institutions in the region to make use of this sophisticated equipment.

The light and electron microscopy facilities, complete with ancillary support equipment, are located in proximity to each other within a suite of rooms housed in the School—soon they'll get a new purpose-built space in the new medical school building.

In 2011, the SMHS acquired the multiphoton microscope through funding from the SMHS, UND, and COBRE. This instrument was a big leap in analytical technology for the scientists.

"We purchased it primarily to allow investigators to follow molecular and cellular events in live animals," said Grove, explaining that this technology is ideal for gaining images deep inside live tissues without causing damage. "They're able to analyze a living sample in real time, which is of special interest here to folks interested in such areas as brain function, neurodegenerative diseases, and bacterial pathogenesis. We frequently see this kind of instrumentation used to monitor and track physiological activity in a wide array of organ systems."

"Most recently we acquired the Olympus TIRF microscope system; with that instrumentation you can follow cellular activity over many hours," Grove said. "It's set up so that you can keep cells alive for as long as you want."

"It's also set up so that you can monitor events such as calcium changes within cells; you can monitor signaling events within cells using specialized molecules that act as biosensors to tell you what's going on."

TIRF microscopy is also useful to follow cellular events occurring right at the cell–substrate interface.

TIRF also is ideal for studying the function and organization of receptors, ion channels, and transporters at the cell surface.

"A lot of researchers here are doing just that. That's why it was important for us to purchase the Olympus TIRF microscope, which we acquired through funding from a National Institutes of Health Shared Instrumentation Grant," said Grove, who is principal investigator of the grant.

"There are research areas at the SMHS that use this facility a lot," Grove said. "I have been collaborating with Drs. Roxanne Vaughan and Jamie Foster in their efforts to understand the dopamine transporter. In addition, other groups such as Jonathan Geiger's group, Brij Singh's group, Saobo Lei's group, and Dr. Wu's group as well as some folks from the Department of Biology have been using the facility to study a number of questions related to areas such as Alzheimer's disease, calcium signaling and metabolism, epilepsy, bacterial pathogenesis, and cancer. For me, the facility has been critically important for our studies of how A-kinase anchoring proteins control signaling networks within cells."

Grove notes that many of the students in the SMHS also are applying microscopy in the facility to research problems.

"The nature of modern microscope technology today allows us to study molecular events at the cellular level with a degree of resolution that was not possible just a decade ago," Grove said. "As a result, microscopy has become critical to our quest to understand cellular and physiological processes, and in many instances, it is the only way in which we can begin to figure out their mechanisms."

"For a school our size, we are extremely well-equipped with the kind of sophisticated microscopy equipment that will be necessary for answering many of the exciting, unresolved questions that we still have about the structure and function of cells in health and disease," Grove said.

For more information, visit the Edward C Carlson Imaging and Image Analysis Core facility website at http://www.med.und.edu/imaging/index.cfm.

Types of microscopy

Light, or optical and fluorescence—Uses visible light to illuminate the object to be magnified through a system of glass lenses. Fluorescence microscopes visualize fluorescent dyes.

Confocal—A fluorescence microscope that sharpens the image by eliminating extraneous light and increasing the "crispness" of the sample being viewed.

Fluorescence resonance energy transfer (FRET)—Used mostly to analyze molecular activity in living cells, FRET sees changes in fluorescence when two fluorescent molecules come close together.

Multiphoton fluorescence microscopy (MFM)—This is a highly specialized form of optical-fluorescence microscopy that uses pulsed infrared laser light to stimulate the natural fluorescence in the sample that is being observed. Used to study biological processes in animal models.

Scanning electron microscopy (SEM)—Invented in 1937, SEM uses a beam of electrons to scan the surface of a sample. SEM allows cellular structures to be seen at a higher level of detail than is possible with light or fluorescence microscopy.

Total internal reflection fluorescence (TIRF)—Uses laser light reflected internally off of the underside of a glass coverslip to visualize cellular structures and molecules at the cell surface.

Transmission electron microscopy (TEM)—Passes electron beam through a thin section of a sample; the image is formed by focusing the beam using electromagnetic lenses on a phosphorescent screen, film, or a digital imaging system. TEM allows cellular structures to be visualized at a level of detail that exceeds what is possible with light microscopy by up to 200 times.

On the Rise

The new SMHS building moves to the construction administration phase.

By Lonnie Laffen, President and CEO, JLG Architects

A new school year is upon us, and with it comes a new phase in the architectural process for the new University of North Dakota School of Medicine and Health Sciences building. The design work is now completed, and we are fully engaged in the construction of this groundbreaking facility—and, I'm pleased to note, on budget and ahead of schedule.

As noted in previous issues, the site has technically been under construction since early May, thanks to the construction-manager-at-risk process, in which PCL Construction Services and Community Contractors were selected at the same time as the architecture team to assist with cost estimating and to get an early jump on efforts such as soils correction and the ordering of long-lead-time materials. However, the actual design was only recently completed in mid-July with the finalization of the construction documents.

While we knew, generally, the size of the building and how it fit on the site, the details were fully determined in the construction documents (CDs) phase, in which the design team put together the detailed plans. The CDs include very specific minutiae, like the size and placement of the door hinges. On this project, a single CD set is made up of 537 sheets, which translates to roughly 6,000 square feet of paper. During the previous design development phase, PCL and Community Contractors were able to put together a guaranteed maximum price, or GMP, which pledges they will build the entire SMHS for a set price. After CDs were complete, the changes between the

design development and the construction documents phases amounted to less than 0.2%—an awesome number for the largest project in the history of our state.

With construction fully underway, PCL and Community Contractors have made tremendous progress in a short amount of time. Concrete grade beams, which sit six feet on top of the piles, were complete as of mid-August. After the grade beams were in place, the entire site was backfilled. A 140-foot-tall tower crane was erected, which will remain for the rest of the project, assisting workers with "flying in" equipment and material, and locating major parts of the building.

If you were to pass by the site today, you will see that PCL and Community Contractors have poured concrete columns and located and installed major site utilities. The first deck, or floor, will be poured before the printing of this article. This will include 500 cubic yards of concrete, equal to the weight of five Boeing 747s. The concrete will be placed on the deck with the use of a pump truck, which can move concrete at a speed of more than 100 cubic yards per hour. While you may think that the first deck would mean the ground level, in construction it is actually the level above. In fact, the at-grade level, or slab, is actually the last to be poured. Why, you ask? The number of subcontractors working on the ground-level is immense because of the number of utilities. If we waited until all of the subs were complete and coordinated, it would have halted all other concrete work and the building would not be enclosed before winter. There will be fourteen total concrete pours this summer and fall, representing about 75 percent of the floors on the project, and the team has logged over 15,000 worker hours—and counting—on the site to date.

PCL and Community Contractors have gone above and beyond to ensure that the SMHS building lives up to the exceptional standards for which UND is known. Their rigorous safety and health standards have kept them accident-free since day one, and many visitors have remarked at how clean and organized—and smoke-free—the site is at all times. All of us at JLG really appreciate their level of care, as we know this attention to detail and respect for the environment will extend to every aspect of the construction process and will deliver a building that lives up to the intent of the design.

Just as a building has code requirements, a construction site has them too. For example, if you go over to the site, you will notice a portable restroom, or port-a-potty, with a steel cage around it. Code requires a certain number of restrooms within a certain proximity to a certain number of workers on site, so the construction managers "fly" the restrooms around the site with a crane for use wherever needed for an extended period of time—including up to the second-level deck.

Even though design is complete, JLG, Steinberg Architects, and Perkins+Will will be active participants in the project through not only the entire construction process but long after. We are currently in a phase called Construction Administration in which we collaborate with the construction managers to bring to life the building and make sure what was designed is actually built. Thanks to top-of-the-line technology, we can reference documents and drawings in the field using only an iPad, where we can collaborate on markups (called redlines) and track document progress and share them immediately among all of the disciplines on the site.

We may have snow by the next issue, and so you will hear more about the importance of enclosing a building in North Dakota. Until then, check out the on-site website camera at http://oxblue.com/open/pcl/UNDSMHS and have a beautiful fall!

Lonnie Laffen

Raising a North Dakota Healthcare Family

By Stacy Kusler

At home and at work, Ken and Lucille Peterson nurtured generations of doctors.

Many healthcare facilities face retention of their healthcare workforce as an ongoing challenge. Even before retention becomes an issue in the professional world, it starts as an issue in the educational world. How do we keep medical students succeeding through the most challenging times of school to eventually get them to be practicing physicians in a community?

If you ask Dr. Ken Peterson that question, he will give you a knowing nod that says it's not an easy answer. Peterson experienced and observed the journeys of University of North Dakota medical students for nearly 40 years while he was a member of the adjunct faculty for the School of Medicine and Health Sciences. What Peterson will rarely admit is that he had a hand in producing many physicians and medical professionals who are practicing today just by being a supportive and understanding instructor who gave his time and energy to help students through school.

Dr. Ken Peterson ('69, '72) has always had a natural knack for being someone you can trust, someone you can talk to, someone who listens when he needs to and gives advice when he feels it's right. Maybe it's his counseling background. Maybe it's his pastoral background. Or, maybe "it just came naturally," said Peterson.

"I've always had an interest in human behavior and psychology," Peterson said. "That and I loved learning so much that I just continued going to school." Peterson is no stranger to the classroom, as an instructor or as a student.

Before attending UND, where he earned his master's and PhD in counseling and guidance from the College of Education and Human Development, Peterson graduated from Waldorf College in Iowa and St. Olaf College in Northfield, Minn. He married his wife Lucille in 1954. He became ordained as a Lutheran minister in 1962 after attending seminary. He then took a leap of faith (pun intended) and relocated his family to Grand Forks after hearing about a master's program at UND that interested him. The decision was a successful one. While completing his education at UND, Peterson opened his own private psychotherapy practice in Grand Forks. He also served as pastor for a small Lutheran church in Inkster, N.Dak., for 35 years, all while he and Lucille also had four children!

After completing his own education and beginning his own career, Peterson became an adjunct faculty member at the UND SMHS, teaching small groups of first- and second-year medical students in a patient interviewing class. It was here that Peterson's influence on retaining medical students was first born.

"Few people realized the sacrifices students had—and have—to make to pursue a career in medicine," said Peterson. "It wasn't long into that first year that some would question their decision to enter med school. Disclosing their doubts to others was not easy. Parents, family, and others were of course proud that they were 'now in med school.' Thoughts of letting others down [or] wondering if they had the ability [to continue] were truly troubling experiences for some of them."

Through these times, Peterson offered caring guidance and supportive feedback to medical students. "He was a great facilitator of these groups because he was a great clinician in private practice," said Chester Fritz Distinguished Professor Sharon Wilsnack, PhD, director of the neuroscience program for which Peterson instructed. The clinical skills he used in his private practice were useful in recognizing each person's individual way of handling problems.

Peterson was supportive of his students not only in the classroom but outside of it as well. During the middle of one particular school year, a fellow professor at the medical school passed away after a difficult battle with illness.

Ken and Lucille Peterson

The students took the loss very hard, and Peterson was there to tend to the personal and emotional side of the loss while helping them move on and continue with medical school. On another occasion, Peterson recalled rushing downtown to the riverbank in Grand Forks to be with a student while the authorities searched the river for her fiancé, who went missing during a canoe outing. On a happier note, Peterson recalled offering his own home for a medical student to have his wedding there, which Peterson himself officiated. This wasn't the only time Peterson opened his home to medical students. One of Peterson's sons, Dr. Mark Peterson, remembered his dad inviting medical students to the house over Christmas breaks. "It gave us exposure to these students and helped create the sense that this was something that was possible for us, as well." Two of Peterson's sons later completed medical school and currently practice in Grand Forks.

For generations to come

Through Peterson's work at the medical school, he assisted numerous medical students who went on to become doctors; some still practice in North Dakota. On a personal level, Peterson passed on his love for medicine and for helping others to his four children. Two of his children graduated from the UND SMHS (Mark Peterson, MD '89; and Thomas Peterson, MD '90) and have gone on to expand the medical landscape in North Dakota. Thomas Peterson started the Richard P. Stadter Psychiatric Hospital in Grand Forks, as well as the Center for Psychiatric Care. He provides psychiatric services to these two facilities as well as to rural North Dakota and Minnesota. Mark Peterson owns and manages the Aurora Clinic, a family medicine practice in Grand Forks. He also spends part of his time providing rural North Dakota facilities with family medicine care. Ken and Lucille Peterson's two daughters, Kathryn and Karin, along with their families, reside in Colorado Springs, Colo., and Rochester, Minn., respectively.

Then and now

Since retiring from both teaching and leading church services on the weekends, Ken Peterson and his wife Lucille spend their summers at their Minnesota lake home. Ken writes books about faith and family, and Lucille edits his work. Ken is also a self-taught film and documentary maker. They enjoy tending to their rose bushes and flower beds in between the many visitors to their lake home.

Collaborating to Improve Cardiac Care

Evaluating a lifesaving device leads to a cooperative effort to review statewide cardiac care.

By Nikki Massmann

Members of the Center for Rural Health's cardiac-care systems evaluation team are, left to right, Karin Becker, Carmen Cryer, Dustin Dalbey, Eric Souvannasacd, Makenzie McPherson, and Ralph Renger.

CPR is an initialism most people recognize. It stands for cardiopulmonary resuscitation, which when performed efficiently, saves lives of those suffering a cardiac arrest. Many people are trained in CPR, but few know how to effectively use it. Performing CPR is physically intense and can be emotionally draining, even for professional emergency medical personnel, who are well trained in doing so. The effectiveness of CPR drops quickly, even after only a minute.

A relatively new medical device, known as a LUCAS 2 Chest Compression System (LUCAS 2), is changing how CPR is administered. The LUCAS 2 is a mechanical CPR device that delivers automated and consistent chest compressions for a patient suffering cardiac arrest. The device is lightweight and portable and can be applied in less than a minute. LUCAS stands for Lund University Cardiopulmonary Assist System.

In October of 2013, the state health departments of North Dakota and South Dakota received grants of just over $7 million to provide LUCAS 2 devices to more than 400 ambulances and hospitals across the two states. The grant, provided by the Leona M. and Harry B. Helmsley Charitable Trust, represents the most expansive use of the new technology in the nation.

Once the LUCAS 2 devices were in place in North Dakota, the state health department's Division of Emergency Medical Services and Trauma (DEMST) was in need of an evaluation of the effectiveness of the devices on patient outcomes. They wanted to know how often the devices were used, when they were used, and the outcomes for those patients receiving CPR from the LUCAS 2. Having a history of working with the Center for Rural Health (CRH) at the University of North Dakota School of Medicine and Health Sciences, the DEMST approached the CRH with the need for evaluation and the idea to work together.

Ralph Renger, PhD, a professor at the CRH, has over 17 years of experience in the evaluation field. He approached the evaluation of the use of the LUCAS 2 device in the state as not just an evaluation of the device but as an assessment of the entire cardiac care system within North Dakota.

"The LUCAS 2 device is an important piece of the way we care for patients with cardiac arrest," said Renger. "With cardiac arrest, time is of the essence. The LUCAS 2 device works quickly and allows emergency personnel to provide other types of needed care for a cardiac-arrest patient, such as administering IV medications. It's one factor in the big picture."

That "big picture" is a statewide system of care for cardiac-arrest patients. The system has many elements, particularly in rural areas. In a large city, residents may be only a few minutes from the nearest ambulance and emergency room, and their hospital is likely equipped to treat a cardiac patient. But in rural North Dakota, a cardiac-arrest patient may be transferred

from one ambulance to another and from one hospital to another.

In order to fully understand the system and engage healthcare professionals in the evaluation process, Renger and the CRH evaluation team began meeting with emergency medical professionals and hospital staff in rural communities throughout the state to create process flow maps (PFM). The PFMs provide a visual representation of how all parts of the system affect each other. Creating the PFMs is a collaborative effort and requires commitment and input from all organizations involved in treating a cardiac-arrest patient, from dispatchers to rescue personnel to hospital staff. The goal is to create a synthesized PFM for long-term use so that the North Dakota Department of Health can continually evaluate and improve the statewide system. The project has quickly expanded to include South Dakota as well.

"The health departments in North and South Dakota are working together on their statewide cardiac systems of care," said Renger. "All of the leadership meetings for this project are held together with both states. The decision-making is done collaboratively. The states have slightly different systems in place to deal with cardiac arrest, and they are learning from each other. It's an efficient way to make decisions, and is truly cooperation at its best."

Collaboration has been a key factor in evaluating and improving the cardiac systems of care in both states. In North Dakota, evaluating the system led several communities, hospitals, and health organizations to coordinate a simulated cardiac-arrest training drill.

"The training drill was very successful and served several purposes," said Renger. "Emergency personnel, dispatchers, and hospital staff received real-time training on treating a patient with cardiac arrest. The drill also informed the evaluation process on the steps involved and helped create the PFM. When we evaluate the system, we're not there to drive the question. It's important that the input comes from those actually doing the work—performing the CPR, administering medications, saving lives. It couldn't have happened if the health systems involved hadn't collaborated so willingly."

While the evaluation project is funded by a three-year grant, the outcomes will be self-sustaining. All of the pieces will be in place for the North Dakota Department of Health to monitor its statewide cardiac system of care and understand where it can make improvements.

"The bottom line is that everyone involved has the same goal: to save more lives," said Renger. "Every element that is improved upon within the cardiac system of care can lead to one more cardiac patient having a positive outcome."

While the CRH has conducted a number of program evaluations over its 34-year history, the recruitment of Renger and the efforts underway for the LUCAS mechanical CPR device represent a significant step forward for the CRH.

"It has been a goal of the Center for Rural Health to develop a full-scale program evaluation division to work alongside our other divisions that focus on community development and engagement, Native American health, health workforce, policy, research, and information dissemination," said Brad Gibbens, deputy director, of the CRH. "The Helmsley Charitable Trust and our partners at DEMST have provided the CRH with the necessary resources to fast-track this development. Ultimately this helps to support the CRH in its efforts to improve health for North Dakotans and others."

The CRH's evaluation team and the UND Television Center developed a video regarding use of the LUCAS device in North Dakota. The video is featured on the Leona M. and Harry B. Helmsley Charitable Trust website: http://helmsleytrust.org/case-studies/lifesaving-cpr-technology-cardiac-arrest-patients.

"The health departments in North and South Dakota are **working together** on their statewide cardiac systems of care."

Doctor of Physical Therapy Class of 2016

Fifty-two physical therapy students, members of the Doctor of Physical Therapy (DPT) Class of 2016, started the clinical studies portion of their journey to become doctors of physical therapy at the University of North Dakota School of Medicine and Health Sciences. The students received white coats at the Entrance Into Professional Service Ceremony held at the Alerus Center on July 17.

The students, 16 men and 36 women, range in age from 21 to 36 years, with the average age of 23. Many are from North Dakota, and most completed their pre-PT coursework at UND.

Keynote speaker was William A. Hatherill, chief executive officer of the Federation of State Boards of Physical Therapy.

For more information and a list of student's hometowns, read more at http://tinyurl.com/l3c4y4t.

begins clinical studies at SMHS

Front row, left to right: Kelli Renner, Kayla Hoff, Anna Jung, Sierra Maucort, Nicole Jefferson, Brittany Griffith, Laura Nelson, Katie Anderson, Mary Loken, Rachel Pederson, Betsy Richards, Lyndsey Wunderlich, Sierra Heeren, and Lisa Grandpre.

Middle row: Cory Sailer, Alex Barney, Megan Storstad, Kelsey Meyer, Paige Nordstrom, Corissa Kruse, Brie Dahl, Toni Linneman, Ashley Sebelius, Kayla Andreasen, Brittany Wirth, Amy Harmon, Catherine Heggie, Talya Tysver, Holly Koch, Julia Fisher, Megan Volden, Heidi Hansen, Erica Hjelmstad, and Daniel Vilaubi.

Back row: Eric Estes, Mike Brooks, Ty Bommersbach, Joe Taylor, Adam Meidinger, Brett Morlock, Braidy Solie, Jamie Flint, Anthony Charbonneau, Brandon Moeller, Natalie Gleason, Jennifer Ramsay, Lisa Monson, Brittney Herbst, Joel Kramer, Robert Kasprick, Eric Nefstead, and Brooke Vandenbergh.

Hope and Healing

When medical treatments are expensive for those who may be just down on their luck, a UND alumnus and soon-to-be Sioux Award recipient is helping patients receive needed breast cancer treatments and rehabilitation.

By Jessica Sobolik

Dr. Schuh, wearing sunglasses, embarked on an African safari with this travel group, including guides.

Breast cancer doesn't affect only women who can afford expensive treatment through their health insurance policies. Take Janice, for example. She lost her job at the age of 60 when her longtime employer downsized. She was diagnosed with breast cancer less than two months later.

Chantelle, a new mom who had just lost her own mother to breast cancer, exhausted her insurance benefits one week after her own diagnosis. Kim, a single mom and self-employed hairdresser, couldn't continue working while receiving treatment for breast cancer and therefore couldn't afford health insurance.

These are a few of the 1,000-plus patients who received treatment and support through the Gateway to Hope Foundation cofounded by Dr. Marlys Schuh, BSMT '73, BSMed '77; and Dr. David Caplin in St. Louis, Mo. Schuh's desire to help these women is one of the reasons she was nominated for a Sioux Award by the UND Alumni Association and Foundation this year.

Gateway to Hope provides comprehensive breast cancer care from surgery to radiation as well as medical oncology and reconstruction for women who are uninsured or underinsured. The Foundation utilizes 165 partners and providers with the overall goal of returning the women to "normal life" after treatment. "Think of it as a cancer center without

walls," Schuh said. For more information, visit www.gthstl.org.

The Lakota, N.Dak., native and her colleagues enlist the help of physicians from all disciplines, including surgeons like her, and also from other diagnostic and care centers. All of the health providers' time and their high-quality care are donated. "Everyone has donated a little bit, and it has grown exponentially from there," Schuh said. "It's gotten to be that breast cancer can be very expensive to treat, including radiation and medication."

It's impressive that so many partners have joined the endeavor. Schuh says they don't often hear "No." "Everyone is willing to do something," she said. "It's been very gratifying. Women say, 'I didn't know where to turn.' There is Medicaid, but not all qualify."

Multidisciplinary Care

Creating the Foundation was not the only time Schuh used her Midwestern common sense and work ethic to identify a problem and find a way to fix it. After earning her medical degree from Washington University in St. Louis, and completing her surgical residency at the same facility, she completed a surgical oncology fellowship at the Roswell Park Cancer Institute in New York. There, she experienced one of the first multidisciplinary cancer treatment groups in the nation. "When I came back to St. Louis, it made sense for cancer patients to get their care in one place," Schuh said. With colleagues, she helped form the St. Louis Cancer and Breast Institute, which recently merged with Mercy Clinic, one of the larger hospital networks in the area.

The multidisciplinary care team includes medical and radiation oncologists, surgeons, nurses, genetics counselors, pathologists, nutritionists, radiologists, and researchers who explore new treatment options. "Good patient continuity equals good patient care," Schuh said. "Patients didn't have to go to different places for radiology, surgery, etc. They knew they would get coordinated comprehensive care."

The continuity-of-care model also helped improve communication between healthcare providers and patients. "By the time they were partway through treatment, they were on a first-name basis here," Schuh said.

Fond of UND

Dr. Schuh still returns to North Dakota periodically to visit her mother and family in Lakota and her sister Janice, BSMT '68, in Grand Forks. She acknowledged that UND provided an excellent foundation to build her career upon. "When I transferred to Washington University in St. Louis, it was daunting," she admitted. "I came from a small town. How was I going to stack up? But we were well-prepared."

She has fond memories of Eileen Simonson Nelson, assistant professor of Pathology, and Jean Saumur, director of the UND Medical Technology program (1949–1978). William Eugene Cornatzer, MD, PhD, chair of the Department of Biochemistry and Molecular Biology (1951–1983), was also influential. "Dr. Cornatzer was so energetic and enthusiastic," Schuh said. "I can still see him hopping down the halls."

Schuh continues to share the idea of multidisciplinary healthcare with interested providers across the United States. "This can be done elsewhere," she said. "Healthcare is evolving very rapidly. There's the Affordable Care Act. Patient needs are changing. The need is not less, but the needs are different. We all are trying to adapt."

For a video of Schuh, visit http://www.mercy.net/doctor/marlys-e-schuh-md.

The annual awards given before commencement to fourth-year medical students at the UND School of Medicine and Health Sciences were first provided as early as 1977 (although not always in conjunction with commencement). In 1977, Marlys Schuh received these awards:

- The North Dakota State Medical Association Prize for an outstanding student in microbiology.
- The Robert D. Campbell Prize for scholastic excellence in the first and second years.
- The Grand Forks Clinic Award given in memory of Dr. R. O. Goehl, Sr., by the Grand Forks Clinic to a sophomore student for outstanding performance in biochemistry.

She was one of 10 women in her class of 66 students.

'10s

Laura Ermer, PA '14, is now at Pembina County Memorial Hospital in Cavalier, N.Dak., seeing patients at CliniCare.

Ahmad Hazem, IM Res '14, has joined the hospitalist department at Essentia Health–St. Mary's Medical Center in Duluth, Minn.

Suhail Alkilani, FM Res '13, has joined Trinity Health in Minot.

Taleb Taha, FM Res '13, has joined the faculty at St. Alexius Medical Center Hospital in Bismarck.

Muhammad Jawad Sethi, IM Res '12, has joined the medical staff at Trinity Health in Minot as an endocrinologist and lipidologist. He will also serve as medical director of the Trinity Health Diabetes Center.

Jean Gustafson, MD '11, has joined the family medicine department at Mid Dakota Clinic in Bismarck.

Ashley Kremer, MD '11, FM Res '14, has joined the team of medical doctors at Heart of America Medical Center in Rugby, N.Dak. Originally from Tioga, Kremer will be providing women's healthcare, prenatal care, and expanding on the current services offered at the clinic.

'00s

Krystal Butgereit, MOT '05, has joined the team of rehab specialists at Trinity Health in Minot. Originally from Mohall, N.Dak., Butgereit has eight years of pediatric OT experience, practicing previously in Idaho.

Jeremiah Penn, FM Res '05, has joined Mid Dakota TODAY Clinic in Bismarck.

Becky Benz, MD '01, is now at Advanced Medical Imaging Consultants, PC in Fort Collins, Colo., as a practicing radiologist.

'90s

David Erickson, MD '97, has joined the Park Ridge Health team of providers and specialists in Hendersonville, N.C. Erickson, a board-certified pediatrician, has been providing care for 14 years. Previously he had been at Bemidji, Minn., where he served about 8,000 patients each year as a pediatrician at Sanford Clinic.

Kay Rau, PA '95, retired from her work at the Napoleon Clinic in Napoleon, N.Dak., after 42 years of practicing medicine. She was a practicing physician assistant for the past 19 years.

Todd Cortese, BS OT '91, is now at St. Luke's in Duluth, Minn., as an acute rehabilitation program manager. Before joining St. Luke's, he worked as the rehabilitation director at Grand Itasca Clinic and Hospital in Grand Rapids, Minn.

'80s

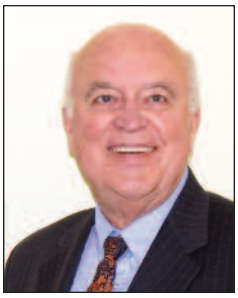
Randall Flick, MD '87, has been named medical director of the Mayo Clinic Children's Center in Rochester, Minn. A native of Fargo, N.Dak., Flick oversees the care that Mayo provides for all children, including relationsips with its satellite facilities in Florida and Arizona, as well as through its affiliation with Altru Health System in Grand Forks.

Eric Lunn, BS Med '82, has been named the next president of Altru Health System in Grand Forks. The chief medical executive succeeds current president Casey Ryan, who held the role for 17 years. Lunn's first day will be January 1, 2015.

'70s

Jay Spracklen, BS PT '79, has joined the rehabilitation staff at Eastmont Towers in Lincoln, Neb.

'60s



Stanley Sateren, BS Med '67, was honored with the Lifetime Achievement Award during the Physician Recognition Celebration at Mount Carmel Hospital in Columbus, Ohio.

Sateren graduated from Northwestern University Medical School, Chicago, Ill., in 1969. After completing a rotating type 0 internship at Mercy Medical Center in Springfield, Ohio, he worked as a "general practitioner" in Britton, S.Dak., for three years. This was followed by a three-year internal medicine residency at Mount Carmel Medical Center.

In 1976, he joined the Mount Carmel medical staff and began working at Mount Carmel East Hospital as chief critical care physician, a position he held for 18 years. During that time, he assisted with the development of the Critical Care Program and other hospital-based physician programs such as Medical House Physicians, both of which he directed. He served as vice president of System Medical Affairs at Mount Carmel East from 1994 to 2002.

Throughout his tenure at Mount Carmel, Sateren served on the following Mount Carmel committees: Clinical Department Council (1979–2002); Continuing Medical Education Committee (1980–2002); Medical Staff Peer Support Committee (1988–2005, chair 1988–2002); Special Care Units Committee (1977–2000, chair 1977–1988); Ethics Advisory Committee (1986–1993); Advanced Treatment and Bionics Institute Advisory Committee (1986–1989); Patient Care Committee (1977–1992); Hospital Code Blue Committee chair (1977–1995); Medical Informatics Committee (1995–1997); and the Infection Study Committee (1986–1995).

In addition to Sateren's commitment to quality patient care and education, he has been an advocate and a visionary regarding physician health and well-being. He was an early leader in computer applications in medicine. Many of these activities were covered by local and national media outlets. He planned and directed over 150 continuing medical education programs, ranging from the 1985 hands-on workshops "Accessing Remote Medical Information Data Bases" that introduced physicians to online medical literature searches to the "Annual Mount Carmel Medical Staff Wellness Symposia" from 1990–2003—a retreat for medical staff members and their families.

From 2002 to 2009, Sateren served as president and medical director of the Ohio Physicians Healthy Program. Sateren is certified by the American Board of Internal Medicine and the American Board of Addiction Medicine. He is a fellow of the American Society of Addiction Medicine.

He retired from the medical staff in October, 2009, and was granted honorary staff category.

Got news?

We want to hear it!

Please send your news items for the next issue of ***North Dakota Medicine*** to Kristen Peterson: kristen.peterson@med.und.edu or call 701.777.4305.

Doctor of Medicine Class of 2018

Seventy-eight first-year medical students, members of the Doctor of Medicine Class of 2018, began their journey to become physicians at the University of North Dakota School of Medicine and Health Sciences. Students were formally inducted at the School's White Coat Ceremony on August 8. The students, 47 men and 31 women, range in age from 21 to 36 years, with the average age of 24.
They come to medical school with work experience in an array of fields and academic degrees.

David O. Monson, MD, delivered the keynote address for the ceremony titled "We've Only Just Begun." Monson lives with his wife Lola Rognlie Monson, also a UND graduate, in River Forest, Ill., a Chicago suburb. He earned his BA and BS degrees in medicine from UND in 1961. For more information, please read more at http://tinyurl.com/m2mkck8.

begins studies at the SMHS

Front row, left to right: Dean Joshua Wynne, Deland Weyrauch, Meg Staires, Nathan Seven, Rebecca Oglesbee, Abigail Feldman-O'Leary, Lisa Poole, Katherine Wilt, Katrina Lybeck, Carrie Mahurin, Mari Goldade, Dhilhan Marasinghe, Whitney Bettenhausen, Kelsey Lambrecht, Jennifer Glatt, Elizabeth Anderson, Kathryn Johnson, Benjamin Maliske, and Adria Johnson.

Second row: Benjamin Keith, Daniel Kolm, Nolan Kleinjan, Thomas Seaver, Spencer Campbell, Anna-Lisa Martino, Sabina Hyder, Jordan Bleth, Justin Buzick, Siri Urquhart, Travis Geier, Lejla Gasevic, Grace Carson, Brock Davidson, Joley Beeler, Anthony Arveschoug, Travis Anderson, Seth Kalin, Daniel Augustadt, and Jill Wieser.

Third row: Jonathan Werner, Gregory Wieland, Amber Stola, Marc Granrud, Logan Erz, Tempset Dawson, Megan Strube, Justin Berger, Joshua Brackett, Matthew Glogoza, Cory Miller, Weston Bowker, Landon Melchior, Mary Jeno, Katherine Benedict, Tyrone Berenston, Anna Kozlowski, Bruce Pehl, and Seth Zygarlicke.

Fourth row: Vanessa Stumpf, Matthew Wagner, Adam Swigost, Adel Mergoum, Nabeel Hyder, Kiswendsida Ouegarogo, Jordan Ernst, Erik Arnold, Brandon Hart, Cameron MacInnis, Brandon Fisher, Maxwell Otto, Jocelyn Fetsch, Megan Schmidt, Elizabeth Blair, Shane Gores, Jason Greenwood, Michael Gilchrist, Eric Christensen, Mark Hovland, and Jared Steinberger.

Carl John Baumgartner, BS Med '63, age 81, of Bloomington, Minn., passed away on Friday, June 13, 2014, joining Sharon, his bride of 51 years, who passed away on March 13, 2014. He was the son of Cecile Delores Dohnalek and Carl John Baumgartner.

Robert G. Fischer, (Bob), 93, Grand Forks, N.Dak., passed away on Saturday, July 26, 2014, at 4000 Valley Square–Woodside Village, Grand Forks. Robert George Fischer was born on October 17, 1920, in St. Paul, Minn. He was the son of Frederick and Agnes (Cooney) Fischer. He graduated from Mechanic Arts High School, where he was on the swimming and water polo teams. He went on to obtain a BS degree from the University of Minnesota, where he was in ROTC. He served in the Fifth Army as a captain in the Second World War, and he saw action in North Africa and Italy. He served in Europe for "two years seven months and five days," which he liked to tell his family frequently. He returned to the University of Minnesota and completed his master's and PhD in microbiology. He met Margaret Mary Roddy at a USO dance, and they were married in Anoka, Minn., on June 28, 1947. In 1948, he and Margaret moved to Grand Forks, where he took a position in the Microbiology Department in the School of Medicine at the University of North Dakota. Bob was to spend his entire career at UND, serving as chair for 20 years. Under his guidance, there was a great increase in research and development. Through his efforts, he was able to secure substantial research dollars for cancer studies and virology. The Fischers raised three children in Grand Forks: Mary (Dan) Martinsen, Redmond, Wash.; John (Karen) Fischer, Bloomfield Township, Mich.; and James Fischer, Chicago, Ill. Robert was an avid photographer, and many of his photographs can be seen hanging in buildings at the University, in local business places, and in homes of friends in Grand Forks.

Mary Ann Hoffman, BS OT '59, age 77, of Tucson, Ariz., passed away Monday, June 16, 2014, after a courageous battle with brain cancer. Mary Ann was born April 4, 1937, to Ralph and Ardyce (Stephenson) Wallbridge in Grace City, N.Dak. Upon graduating from high school, she attended the University of North Dakota, earning a degree in occupational therapy. She worked as an occupational therapist in the Veterans Hospital in Des Moines, Iowa, where she met the love of her life Paul R. Hoffman. They were married on June 17, 1961, in Grace City. Their union of 46 years would be blessed with four children. She and Paul soon moved to Tucson, where Paul received his doctoral education at the University of Arizona. In 1964, they moved to Menomonie, Wisc., where they lived for 40 years and raised their children. Mary Ann was a homemaker who happily devoted her life to her family. She was always highly supportive of her children's many activities and sports and was a very active member of the First Congregational Church–United Church of Christ in Menomonie, and more recently a member of Church of the Painted Hills in Tucson. After her children were grown, Mary Ann returned to the work world. Having had polio as a child, she became the peer advisement coordinator for the Center for Independent Living for Western Wisconsin. In 1990, she was invited to the signing of the Americans with Disabilities Act at the White House for her tireless work on behalf of disabled people. Upon retirement, Mary Ann and Paul returned to Tucson. There she was an enthusiastic member of the Red Hat Society and enjoyed spending time with her family and friends. Throughout her life, she was an ardent Bible study member as well as an avid reader who enjoyed book clubs.

Walter Daryl "Bill" Kelsch, BS Med '53, died June 5, 2014. Bill is now with his beloved wife Phyllis, who passed away last August. He is deeply missed but fondly remembered by his family. Bill was born on August 7, 1925, in Glendive, Mont., and grew up delivering papers, riding the railroad, and climbing trees to build his eggshell collection. After graduating from Dawson County High School, he attended the University of Montana. His studies were interrupted by his service in the Navy during the war in the Pacific, stationed in Hawaii. After the war, he returned to U of M to earn both a BA and BS by 1949. While working at the Northern Pacific Hospital in Missoula, he met Phyllis, who was the love of his life. They were married in 1950 and moved to North Dakota where he earned a master's degree in chemistry. He continued his studies at the University of Washington, receiving his MD in 1955, and later specialized in anesthesiology. He was a founding member of Anesthesia Associates of Spokane, serving the Spokane community for many years. An eminently practical man, he was devoted to his family and his gardening, passing on his love for the earth to his children and grandchildren. His curiosity about the world in which he lived was enriched by his extensive traveling with Phyllis. He loved to learn, reading for information and knowledge, and taking classes at the community colleges of Spokane and other venues. He was an avid golfer, and played bridge, cribbage, and poker with his family and friends. He was a member of the Spokane Elks Lodge, Indian Canyon Golf Club, and Central Methodist Church. He and Phyllis contributed much to the Spokane community.

Paul D. Ray, 79, of Grand Forks, N.Dak., was born December 7, 1934, in Monmouth, Ill., the son of Elmer and Dorothy Ray. Dr. Ray died on July 15, 2014, at Altru Hospital in Grand Forks after a brief battle with cancer. Paul grew up on the family farm south of Monmouth. He graduated from Monmouth High School in 1952 and Monmouth College in 1956 with a Bachelor of Science degree in Chemistry. He married Annette Thrift in Chicago, Ill., on June 15, 1957. Paul completed his PhD in Biochemistry at St. Louis University, in St. Louis, Mo., in 1962. He completed a postdoctoral fellowship and held an assistant professorship at the Enzyme Institute at the University of Wisconsin in Madison from 1962 through 1967. In 1967, Paul and Annette moved to Grand Forks, where Paul began his 47-year career at the University of North Dakota in the Department of Biochemistry and Molecular Biology. Paul directed and advised a number of graduate students to their MS and PhD degrees. He was widely

published for his research focusing on liver enzymes as they relate to diabetes and the synthesis of blood sugar. He was extremely proud of his involvement in INMED (Indians Into Medicine Program), and enjoyed his work as a recruiter of student athletes interested in the basic sciences. Paul received a multitude of honors, including the Chester Fritz Distinguished Professorship in 1992. He continued to teach until March of 2014 as professor emeritus. Paul followed all his grandchildren's activities, and was an avid sports fan. He was a die-hard supporter of the Chicago Cubs, as well as UND. He spent a great deal of time at his lake place in Minnesota with family and friends, where he enjoyed fishing and bird-watching. Paul was a 47-year member of Zion United Methodist church and choir and was a longtime supporter of youth performing arts.

James D. Rudd, 63, of Hillsboro, N.Dak., died Saturday, August 2, 2014, at Altru Hospital in Grand Forks after a brief illness. Jim was born July 10, 1951, in Cranford, N.J., the son of James W. and Margaret F. Rudd. He graduated from Cranford High School in 1969 and went on to receive his bachelor's degree in biology from St. Lawrence University in Canton, N.Y., in 1973. Jim started his athletic training career in 1973 when he was an assistant athletic training intern with the Philadelphia Eagles. In 1974, he came to the University of North Dakota as a graduate assistant athletic trainer and received his master's degree in physical education in 1981. He held various athletic training positions at Mercer County Community College in Trenton, N.J.; Kansas State University in Manhattan, Kans.; West Virginia University in Morgantown, W.Va.; and Valdosta State College in Valdosta, Ga. In 1989, he returned to the University of North Dakota as head athletic trainer and program director. In 2004, he was semiretired but continued to teach classes and acted as an academic advisor within the UND School of Medicine and Health Sciences. Jim married Elaine Lerfald from Grand Forks on December 20, 1975, and they had one daughter, Jennifer, who was born on April 6, 1979, in Manhattan, Kans.

Merry K. Turner, BS OT '56, 80, of Hamilton, Mont., passed away on June 12, 2014, at Valley View Estates. She is the wife of Don Edward Turner, 82, of Discovery Care Center also of Hamilton. Born in Fargo N.Dak., she was the only child of Joyce E. (Martin) and Edgar P. Mattson of New Rockford, N.Dak., where she grew up. She attended the University of North Dakota in Grand Forks, where she excelled in a lifelong passion for music and earned her bachelor's degree in occupational therapy. She moved to Hamilton in 1992, where she worked as an occupational therapist in the Home Health Department of Marcus Daly Hospital. Before living in Hamilton, Merry K. and her husband Don lived in Arizona, Colorado, and North Dakota. They enjoyed hiking, camping, and traveling throughout the world together, including a three-month trip to Australia and New Zealand in the late 80s.

Scott Leroy Walker, BS Med '48, passed away May 11, 2014, in Portland, Ore., at the age of 94. He was born to Harry Walker and Margaret Lang in Wishek, N.Dak., on July 9, 1919. Margaret was part of the German farmer migration from the steppes of Russia that relocated to south central North Dakota in the late 1800s. Scott grew up in Ellendale, N.Dak. He became well known for his talent as a clarinet and saxophone player, and played in local bands. He was the winner of the talent show in high school. Following graduation during the depths of the Depression in 1937, he joined the U. S. Army 1st Cavalry at Fort Meade, S.Dak., and played in the band. After discharge, he attended the University of North Dakota at Grand Forks, where he met and married Jeanne LaFleur in 1940. Following the beginning of World War II at Pearl Harbor, he joined the Navy and became a radio operator. At the end of the war, he was a communications officer on the USS *Essex*. Inspired by Navy doctors on the aircraft carrier, he returned to UND in the premed program. He graduated from the Bowman Gray School of Medicine at Wake Forest in 1950. After an internship at the Detroit Receiving Hospital, he did a residency in general practice at the Butte, Mont., Community Hospital. In 1953, he went into private practice in Anaconda, Mont., as a physician and surgeon. He thrived at being a small-town doctor, making house calls, removing tonsils and appendixes, having many friends, enjoying hunting and fishing, being a Rotarian, and raising dogs. He also joined the Freemasons and Shrine. He played in the Shriners' band in Butte and Deer Lodge. In Spokane, he joined the El Katif Shriners concert and Dixieland bands, and continued in Portland with the Al Kader Shriners band into his nineties. He remained a member until his death. In 1962, he married Marian Peterson Mohan. He entered the radiology residency program at the Dallas, Texas, Veterans Hospital. He later served in the VA at Portland and Spokane, where he became chief of radiology. Following retirement, he and Marian moved to Wilsonville, Ore. He will be remembered for his long interest in the practice of medicine, retiring in his late 70s. He was interested in politics, and usually took the side of the party that was out of favor. He was a champion of the underdog. He had varied interests, including being a licensed Ham radio operator, private pilot, sports fan of the Gonzaga Bulldogs and University of Oregon Ducks and Oregon State University Beavers, and the breeding and training of dogs. His love of music and musical skill was passed on to many children and grandchildren.

Appreciated Property

By Alyssa Konickson

Who can benefit from a gift of appreciated property, stock, or securities?
Anyone who is considering a charitable gift or thinking about selling an asset can benefit from a gift of appreciated property. Making a gift to the School of Medicine and Health Sciences through the UND Foundation using appreciated assets such as securities or a mutual fund allows you to give more, favorably affecting your cash flow and minimizing taxes.

What are some examples of appreciated properties?
Stocks, bonds, mutual fund shares, and real estate (for example, farmland and mineral interests in North Dakota) can harbor a number of strategic financial benefits.

Why is this a good time to give?
Most assets have had a nice recovery since the market collapse in 2008 and are valued well above their cost. Converting from one investment to another, in this case an investment in medical education in North Dakota, with a gift of appreciated assets may be a perfect, tax-wise philanthropic strategy.

How do I save on taxes?
When given to the UND Foundation for the benefit of the School of Medicine and Health Sciences, gifts of appreciated property avoid the capital gains tax you would otherwise pay upon selling, produce a charitable income tax deduction for the fair market value of the asset, and in some cases, can be used to provide you income for life. With income tax rates now as high as 39.6 percent, and capital gains tax rates that could be as high as 23.8 percent, the total tax savings on gifts of appreciated property can be significant. In addition, for those taxpayers subject to the 3.8 percent Medicare contribution tax on capital gains, dividends, interest, and other unearned income (those with adjusted gross income over $250,000 filing jointly or $200,000 for singles), the savings may be even higher.

How might a gift of this nature work?
For example, Dr. Jones is single, age 65, and in the 39.6 percent income tax bracket. Capital gains incurred in 2014 will be taxed at the highest capital gains rate, 23.8 percent. Dr. Jones owns securities valued at $250,000, for which he paid $50,000 five years ago. He decides to transfer these securities to a charitable remainder trust with the UND Foundation that will pay him income for the rest of his life equal to 6 percent of the annually valued assets. Here are some of the outcomes of his gift. First, Dr. Jones receives a charitable income tax deduction exceeding $97,000. In his tax bracket, this deduction could save him approximately $38,000. Second, he avoids paying capital gains tax on $200,000 of gain, saving about $47,600. And, if Dr. Jones happens to be a North Dakota resident, his gift is eligible for the North Dakota Tax Credit, providing him a credit on his North Dakota income tax. If he is a North Dakota resident, Dr. Jones's "cost," net of taxes, to establish the charitable remainder trust is reduced substantially from the original gift amount. This trust will provide Dr. Jones $15,000 of income in the first year ($250,000 x 6%). Last, and very important, the School of Medicine and Health Sciences receives the remainder at the trust's maturity. All in all, this is a tax-efficient plan to minimize taxes, increase income, and benefit the SMHS.

The information presented is not legal or tax advice, but is intended as accurate general information. And, although the UND Foundation's gift planning professionals are knowledgeable about giving techniques and their tax consequences, you should seek the advice of a qualified estate and/or tax professional.

For additional information on how to best structure your bequest or gift to benefit the School of Medicine and Health Sciences, please contact:

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Thank you to our thoughtful donors who recently gave gifts or made pledges to support the UND School of Medicine and Health Sciences.

A bequest from the estate of **Linda Redmann** of Seneca, S.C., has established the Linda Redmann Cancer Research Endowment, the Linda Redmann Public Health Endowment, and the Linda Redmann Rural Health Endowment. They will support cancer research, the School's Master of Public Health Program, and the Center for Rural Health, respectively. Redmann, a Crystal, N.Dak., native, earned her bachelor's degree in education from UND in 1967. She died of cancer in March.

Allison and Bud Gentle of San Antonio, Texas, continue to support the Gertrude Dammen/Allison Gentle Medical Education Endowment, which provides scholarships for medical students with a proven record of academic achievement, strong potential to succeed in the future, and financial need, with preference given to a North Dakota student. Allison earned her bachelor's degree in education from UND in 1958, despite her mother's desire for her to enter a medical field. The Gentles created this scholarship as a tribute to Gertrude.

Dr. Joel, MD '93, and Julie Johnson of Park River, N.Dak., made a substantial contribution to the School's Annual Excellence Fund, which supports the dean's top academic priorities.

At commencement in May, Laura Luick, MD '14, is assisted in her hooding by her mentor Othmann Ghribi, PhD, associate professor, Department of Basic Sciences (left), and Martin Rothberg, MD, assistant dean of the Northwest Campus–Minot. In the fall of 2013, she received the Gertrude Dammen/Allison Gentle Medical Education Scholarship.

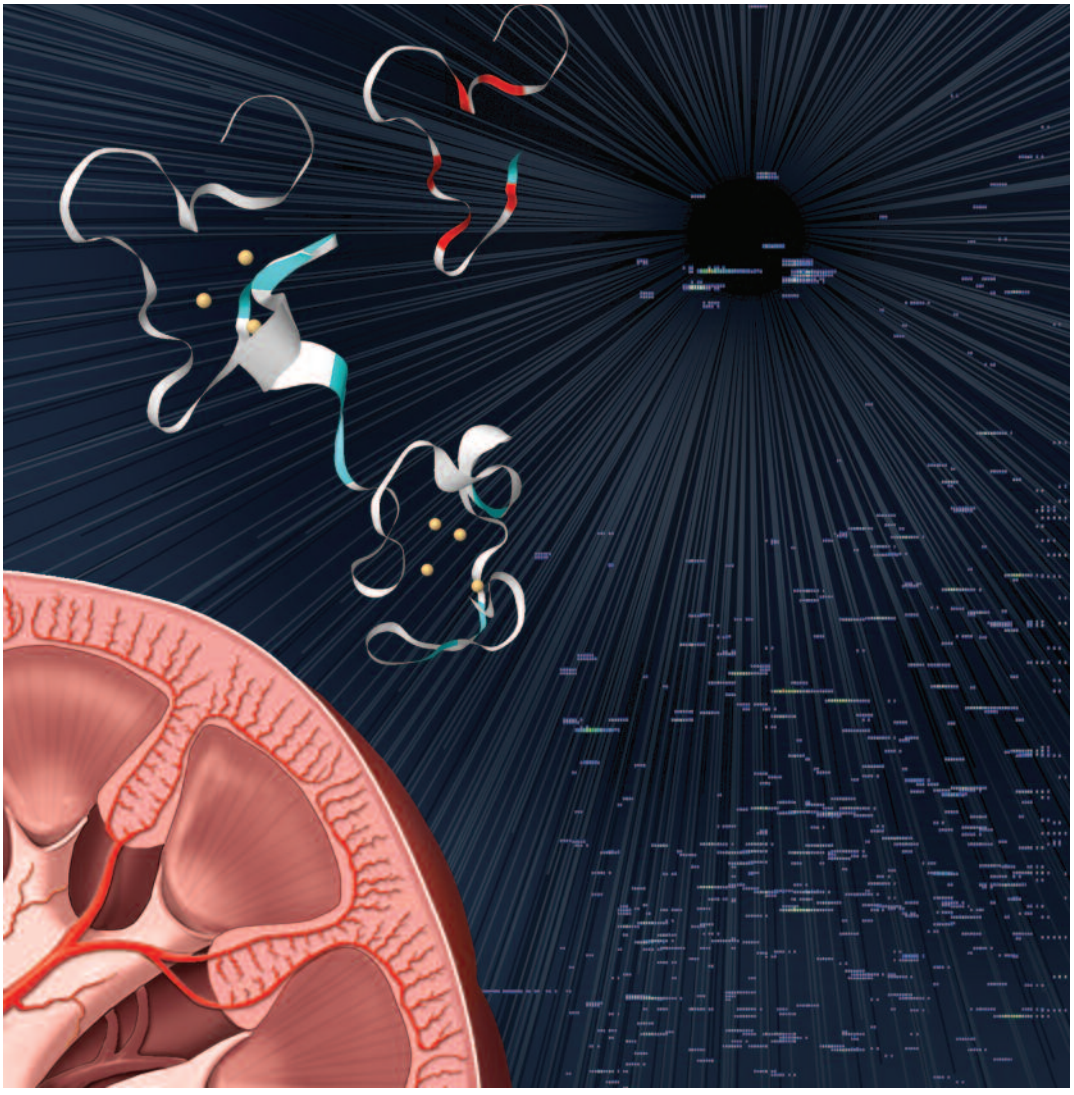
UND ALUMNI ASSOCIATION FOUNDATION

The Department of Family and Community Medicine, and the Office of Medical Education celebrated Dr. Roger Schauer's service to North Dakota on June 17 in the Vennes Atrium at the School. He has been the heart and soul of the Rural Opportunities in Medical Education Program from its inception. His role in the education of our medical students will be greatly missed. Dr. Schauer and his wife Janet are shown listening to Dr. Robert Beattie's remarks about Dr. Schauer and his lasting effect on medical education in the state.

The University of North Dakota held a ceremonial groundbreaking for the new $122 million School of Medicine and Health Sciences building on June 12. Governor Jack Dalrymple, Senators Ray Holmberg, Robert Erbele, Judy Lee, Grand Forks Mayor Michael Brown, Altru Health System CEO Dave Molmen, UND President Robert Kelley, and SMHS Dean Joshua Wynne provided remarks on the effect the new building will have on healthcare training in the state.

At the Groundbreaking Ceremony on a blustery June 12, Governor Jack Dalrymple presents SMHS Dean Joshua Wynne with a signed commemorative ND license plate. The governor reminded Dr. Wynne to properly register and pay applicable fees for the plate.

On June 20, the tower crane that contractors will rely on in the construction of the new SMHS building was up and running.



SMHS researchers from the Departments of Basic Sciences and Pathology had their article titled "Quantitation of Human Metallothionein Isoforms: A Family of Small, Highly Conserved, Cysteine-rich Proteins*" featured on the cover of the April 2014 issue of *Molecular and Cellular Proteomics*.

Aaron A. Mehus, Wallace W. Muhonen, Scott H. Garrett, Seema Somji, Donald A. Sens, and John B. Shabb were the authors. The focus of the article was on metallothioneins, which are small, highly conserved cysteine-rich proteins important for metal homeostasis. The twelve human isoforms, potential biomarkers for heavy metal toxicity and cancer, present special challenges for quantitative proteomics. Associate Professor John Shabb was the lead author. John Lee, a graphic designer in Information Resources, collaborated with Shabb in creating the image on the cover.

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Upcoming Alumni Events*

UND Homecoming 2014
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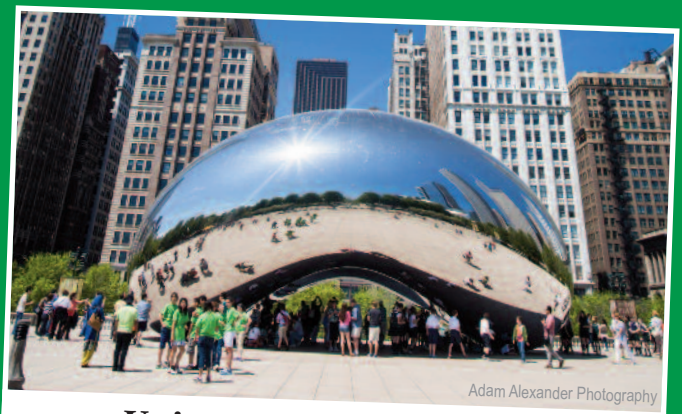

Universities of North and South Dakota Reception
November 8 Chicago, IL

* Invitations are sent via e-mail or mail. To ensure you receive this information and that our records are up-to-date, please submit your contact info at www.med.UND.edu/events/contact.cfm.

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