Dear Friends and Alumni

This year has marked the completion of the third year of the new curriculum and intensive preparation for the final year, a year of clinical rotations for our pioneer class. The past three years have been a lot of hard work on behalf of staff, faculty and students to actually implement this new, integrated, active learning-filled new curriculum. We have assessed our progress and learned as we progressed, revising courses and curriculum when necessary. The pioneer class of 2017 has been an excellent partner in helping us get it right.

As I reflect on what is new with the content (in addition to the integration), I keep coming back to the new public health content as the most substantial change. It was mandated by the CAPE competencies, which were used to develop ACPE’s Standards 2016 so the content is mandated, but it didn’t take a mandate for us to progress along that path as we were planning the new curriculum. It was included as “domain 2” (a domain is a vertically integrated set of competencies and learning experiences) in the curriculum design.

As health care reform progresses, pharmacists are increasingly playing very important public health roles. Our position as the most accessible health care professional places us perfectly to interact with the public and address public health issues. From prevention (e.g., immunizations) and smoking cessation to help with emergency care in disasters, pharmacists have shown time and again that they can help in this realm.

We also have pharmacists working with the underserved to reduce health disparities, educating school age children on the dangers of prescription drug abuse, and working with the drug courts to help find solutions to opiate abuse.

Our students very actively participate in health fairs locally and disease screening internationally to help diagnose chronic diseases so patients can seek treatment. Our first year students take a community health course that prepares them for their first summer IPPE experience in community pharmacies. We want them to assess the overall health of the communities they are assigned to and be able to intervene in helpful ways.

In addition to the public health incorporated into the Pharm.D. curriculum, we have an increasing number of Pharm.D. students who are pursuing the MPH as a dual degree.

In order to fulfill expanding teaching demands in the public health area, the college has hired a number of faculty working as community engaged scholars to advance provision of public health in communities. Drs. Olihe Okoro (AIDS in African-American males), Michelle Johnson Jennings and Derek Jennings (Diabetes in Native Americans), Laura Palombi (opiate misuse), and Meg Little have formed a strong Duluth cohort to work in community health. Notably, the Pharmacy Practice and Pharmaceutical Sciences Department (Duluth) has recently been awarded the distinction of being named a “Community-engaged department” by the University.

Similarly, on The Twin Cities campus we have Oscar Garza (Latino/Latina cultures), Michael Kotlyar (smoking cessation), as well as Shannon Reidt, and Christian Pereira, both of whom have public health backgrounds. This group is also working with communities locally and globally.

The public does not always think of the public health of their communities as a major responsibility of pharmacists. We hope to change that, both by educating our graduating pharmacists and through raising the consciousness and skills of current pharmacists. Public health needs to be the responsibility of all health professionals, and especially those of us who have such great access to the public.

Best wishes,

Marilyn K. Speedie, Ph.D.
Dean
Americans are living longer than ever. According to the World Health Organization, the average life expectancy in the United States today is 79–81 for females and 76 for males. The increased life expectancy brings the challenges associated with chronic health conditions and the need for improved drug therapy through education, clinical care and research. The college is positioned to address the public health challenges associated with geriatric pharmacotherapy issues.

Four faculty members at the college are leading the charge in addressing aging and its impact on public health.

The Cholesterol Connection

Professor and VFW Endowed Chair—Pharmacotherapy for the Elderly Ling Li is an expert in atherosclerosis, diabetes and Alzheimer’s disease. Li’s research focuses on cholesterol and its impact on heart disease and brain health. “Good cholesterol, high-density lipoprotein or HDL, has been established as a protective factor for heart disease and the hypothesis is that what’s good for the heart is also good for the brain,” said Li. “HDL is a modifiable factor by lifestyle and also by application of drugs.” Ling’s ongoing research is focused on the implications of improving vascular function with HDL and its implications with brain function including cognition. Her previous research focused on low-density lipoproteins (LDL) and the role of statins in lowering the risk of Alzheimer’s disease. “For public health age-related conditions, it is still much more important to find preventive approaches or strategies,” said Li.

Assistant Professor Shellina Scheiner monitors medications for older adults in transition between hospital and home.
“Lifestyle changes, including diet and exercise, are both effective in terms of improving HDL function.”

**Home-based Medication Therapy Management**

Assistant Professor Shannon Reidt provides home-based medication therapy management services for Hennepin County Medical Center patients who experience barriers in traveling to the clinic for care. With an average age of 65, the visits offer an opportunity to address a wide range of challenges including medication storage and safety issues, ensuring that medications are appropriate, effective and used correctly.

“In the home setting, we are able to address social and cognitive issues with the aging patient,” said Reidt. “If they are experiencing a symptom or problem, the first thing we consider is if it’s medication-related, which is different from a healthy 40-year-old. Aging patients metabolize medications differently and are often more sensitive to drug-drug interactions and side effects.”

**Managing Transitions**

Assistant Professor Shellina Scheiner practices on an interprofessional team in a transitional care unit. By monitoring medications for older adults in transition between hospital and home, she ensures that medications are safe, effective and appropriate. With the help of her medical and nursing colleagues, Scheiner trains students in geriatrics during their clinical rotations. “It’s important that our students leave with a solid foundation in geriatric pharmacotherapy because they will primarily be serving an aging population.” Scheiner also co-directs the geriatric pharmacotherapy curriculum at the college with Mike Swanoski.

“Management of chronic conditions is only one part of the challenge in aging,” said Scheiner. “We need to address cognitive, functional and social issues, and it’s important for us as pharmacists to contribute our expertise to the team. We are able to make a direct impact on preventing adverse effects, improving patients’ quality of life and saving the health care system millions in unnecessary costs.”

Assistant Professor Shannon Reidt provides home-based services for patients who cannot travel to the clinic.

Professor Ling Li’s research focuses on cholesterol and its impact on heart disease and brain health.
The Triple Aim

Co-Associate Dean for Clinical Affairs Mike Swanoski has more than 30 years of experience in geriatric pharmaceutical care and a research interest in medication utilization in geriatric patients.

For the past three years he has served as a member of the geriatric interdisciplinary care team at Essentia Health in Duluth. Swanoski and his colleagues strive to achieve the triple aim of improving the patient experience, improving the health of the population served, while reducing the per capita cost of care. As the pharmacist on the care team, Swanoski’s role is to offer recommendations to the patient’s primary care provider to ensure that their patient’s medications are the most appropriate, most effective and safest possible.

Through the use of guidelines such as the Beers Criteria and the Pharmacy Quality Alliance’s High Risk Medication in Elderly Patients, Swanoski reviews the patient’s chart for high-risk or potentially inappropriate medications for older adults.

“If a patient is on one of these medications, it will get my attention,” Swanoski explained. “As patients age, they become more susceptible to adverse effect of medications. My role is one of safety for the patients. By being proactive, we are able to keep this population as independent and as safe as possible while assuring their medical needs are adequately treated.”

Co-Associate Dean for Clinical Affairs Mike Swanoski works with a patient’s primary care provider to ensure medications are appropriate, effective and safe.
A Public Health Issue on the Rise

As an Associate Professor in the Department of Medicinal Chemistry, Courtney Aldrich’s research focuses on developing new antibacterial agents for multidrug resistant pathogens, including the bacteria that cause the deadly disease tuberculosis (TB).

It is a challenging public health issue on the rise in the developing world. According to the World Health Organization, tuberculosis is now the leading infectious disease killer worldwide accountable for 1.4 million deaths a year, with more than 95 percent of TB deaths occurring in low- and middle-income countries. In 2014, an estimated 480,000 people developed multidrug-resistant TB.

It’s also a public health challenge stuck in a time warp: Since the introduction of rifampicin in 1971, very few advances have been made in the development of new antibiotics for TB.

“Discovery efforts that led to these drugs haven’t significantly changed from what was taught in the 1970s,” said Aldrich.

Today, all clinically used antibiotics act by one of a small number of mechanisms such as inhibition of protein synthesis, DNA synthesis, cell-wall synthesis and RNA transcription.

“We have used the same compounds to treat TB for more than 45 years,” he said.

Although general bacterial resistance is a big public health problem globally, most of the major pharmaceutical companies abandoned antibiotic discovery decades ago.

“The problem we have now is resistance to the old drugs—and TB is far from eradicated. In Minnesota, for example, there are approximately 200 confirmed cases each year,” said Aldrich.

Costly and Lengthy Treatments, a Large Pill Burden

TB is caused by a highly successful bacterial pathogen that lives within macrophages, the very immune cells that normally neutralize a bacterial infection, making it extremely difficult to develop a vaccine to fight it.

“The typical treatment protocol for TB takes six months of drug therapy with a combination of four drugs,” said Aldrich. “Many of the TB drugs have notorious side effects, from influenza-like syndrome and hepatitis for rifampicin, to deafness and neurotoxicity for some of the second-line drugs.”

As a global public health issue, the college has strongly supported research and discovery efforts for the treatment of tuberculosis and other multidrug resistant pathogens.

“The United States is a leader in global public health and containing infectious disease outbreaks,” said Aldrich. “In today’s world, what happens in other countries can easily come back here. It’s a worthwhile investment for us all.”
Assistant Professor Melanie Nicol studies how the drugs used to treat HIV work in tissues like the gut, genitals and the brain.

“We have a pretty good idea how the virus in the blood responds to drugs, but what is happening in the tissues is not as clear,” she said. “This lack of understanding may be part of the reason we have not yet been able to cure HIV.”

She is currently working on developing models using tissues from the female genital tract to test the efficacy of different drugs to protect the tissues from HIV infection.

“It is my hope that this will lead to a successful therapy that women can use to protect themselves from HIV infection,” she said. “This is particularly important in areas such as sub-Saharan Africa where women are disproportionately affected by the HIV epidemic.”

She is also working with colleagues in the U’s Medical School and the Makerere University in Kampala, Uganda to explore the use of tissues collected during autopsy to look at the distribution of antiviral drugs in the brain.

“Understanding which parts of the brain the drug is concentrating in, relative to where the virus is replicating, will hopefully improve HIV treatment and reduce the CNS complications that often arise from HIV infection,” she said.

Assistant Professors Dr. Michelle Johnson-Jennings and Dr. Derek Jennings work to reduce American Indian health disparities and increase health equity.
Increasing Equity

Assistant Professors Dr. Michelle Johnson-Jennings (Choctaw nation) and Dr. Derek Jennings (Anishinabe Sac & Fox and Quapaw) work to reduce American Indian health disparities and increase American Indian health equity.

Together, they lead the college’s Research for Indigenous Community Health (RICH) center where they collaborate with indigenous populations across Minnesota, the country and in other countries like New Zealand. Working with tribal members and other health professionals, they create culturally respectful interventions to reduce obesity, misuse of medicines, tobacco use and substance use within those communities.

One area of particular interest is improving Native American nutrition. This past summer they invited youth from the Gimaajii, an American Indian Community Housing Organization in Duluth, to participate in planting a rooftop garden that included not only fruits and vegetables, but traditional medicine like sweet grass and sage.

“We found that the youth who participated had a positive change in their attitude and consumption of fruits and vegetables,” said Dr. Jennings.

They have also partnered with the Little Earth community in Minneapolis for the past couple of years to provide programs for adults and children that focus on preventing diabetes and obesity, as well as examining how cultural beliefs influence decisions on food and nutrition.

In 2015 their work was rewarded with part of a $1 million gift from the Shakopee Mdewakanton Sioux Community’s Seeds of Native Health program. The gift will support a publicly accessible, comprehensive, multidisciplinary database on data collected by Drs. Johnson-Jennings and Jennings on best food practices for nutrition, health and wellbeing.

“Our hope is that RICH and our tribal partners can collaboratively define and identify wise food practices, which can be shared for improving Indigenous health across the globe,” said Dr. Johnson-Jennings.

Understanding the Patient Context

Assistant Professor Olihe Okoro trained as a pharmacist in Nigeria. While working at an HIV clinic that offered free health care including medications, Okoro observed that many patients didn’t consistently return for follow-up care or adhere to their medications. She wanted to know why.

“I realized that to be helpful as health care providers, we need to understand and consider the context of each patient — sociocultural, economic and otherwise,” she said. “Additionally, we need to be aware of our own behavior during patient encounters.

When a patient perceives that their provider cares and understands them, they are more actively engaged in their care and more likely to adhere to treatment.”

Since joining the College of Pharmacy, Duluth faculty in 2014, Okoro has continued to study the determinants of health in vulnerable populations, as well as the role of pharmacists in assuring optimal patient outcomes.

She is currently looking at patient satisfaction among low income African American women. She also recently conducted a needs assessment — a pilot study looking at HIV prevention and care in the African-born immigrant population.

Assistant Professor Melanie Nicol develops models to test the efficacy of drugs to protect from HIV infection.
In the classroom, she works with students to build cultural competency.

“To effectively deliver care to the diverse patient population in the U.S., our students need to understand the impact of culture on patients’ health-related behaviors, and learn to be culturally sensitive and responsive,” Okoro said.

Greater Health and Wellbeing for All

Assistant Professor Oscar Garza works with community organizations and organizers, health care providers and the youth in urban and rural underserved communities.

“I am very fortunate to be able to collaborate with very passionate people in the broader community, across the University and within the college, all of whom work tirelessly and often thanklessly in the pursuit of a more just system for promoting and achieving greater health and wellbeing for all of our communities,” said Garza, who is also director of the college’s PRAXIS Institute for Community Health and Education.

Last summer, Dr. Garza led a pilot project to learn about the health needs of migrant and seasonal farm workers in Minnesota, while addressing disparities in access to health care in rural areas through a mobile health care unit. Pharmacy and other health science students, as well as undergraduates and high school youth, participated in the program, which will continue this summer.

This spring, he taught one of the U’s new Grand Challenges courses, “Structural Violence and the Medication Experience,” which brought together students from various majors and programs to examine the intersection of societal structures and cultures within the Chicano and Latino communities in Minnesota, and how they impact community health and individual medication experiences.

According to Garza, pharmacists can make a profound impact on underserved populations.

“Pharmacists, especially those practicing in community settings, are ideally situated for serving an integral role in bringing access to care to those who need it most,” said Garza. “Pharmacists are an invaluable resource for improving the health of our communities and helping people navigate an increasingly complex health care system.”

Assistant Professor Olihe Okoro studies the determinants of health—including the role of pharmacists—in vulnerable populations.
Professor Philip Portoghese recently developed two new compounds that show promise as a breakthrough drug for treating chronic pain.

Many diseases or traumatic conditions are accompanied by inflammation that may lead to increased sensitivity to pain. Generally, the greater sensitivity is due to release of endogenous substances that make nerves that carry pain more sensitive. However, the opioid analgesics commonly prescribed today were originally evaluated on normal, non-inflamed animal models.

Analgesics such as morphine, codeine, oxymorphone, oxycodone are generally effective analgesics for short term relief of pain. However, their efficacy usually declines upon chronic use due to tolerance.

“In an effort to develop medications that are effective for the pharmacotherapy of chronic pain without tolerance, we designed two compounds — MMG22 and MCC22 — that inhibit the action of inflammation-induced release of endogenous mediators that would promote pain sensitization of neurons while simultaneously stimulating opioid receptors in neurons,” said Portoghese.

Both MMG22 and MCC22 have analgesic activity equivalent to morphine in normal mice, but their potency becomes greatly amplified in inflamed mice. Additionally, no tolerance is evident for either of the compounds.

“In a chronic bone cancer mouse model, MMG22 and MCC22 showed much stronger analgesic activity than other common analgesics that had been approved by the Food and Drug Administration,” said Portoghese.
model, MMG22 was 3.6-million times greater than morphine,” said Portoghese. “MCC22 was found to be highly effective in the treatment of chronic pain resulting from chemotherapy-induced neuropathy and sickle cell disease.”

Both compounds are currently undergoing preclinical evaluation at the University of Minnesota.

**Optimizing Pain Relief**

Professor Carolyn Fairbanks is also working to advance the understanding of the mechanisms underlying the development of chronic pain and to optimize innovative approaches to provide pain relief.

“Our approach is to develop strategies to activate inhibitory systems both independently of opioid analgesics and as synergistic partners to opioid analgesics,” she said. “Through synergistic combinations it is possible to access the powerful inhibitory systems of the opioid receptors with significantly lowered dose requirements, thereby reducing the risk of the well-known side effect limitations.”

Fairbanks’ goal is to refine and improve the effectiveness and safety of opioids and other analgesic medications to treat chronic pain.

Her research focuses on development of novel compounds or therapeutics with ideal characteristics for spinal delivery for pain relief.

“Spinal delivery of analgesics or gene therapeutics that activate or optimize inhibitory systems offers a very selective method of pain control...”

Assistant Professor Laura Palombi works with communities in northern Minnesota to address heroin and opiate abuse.
that can increase the therapeutic index of such analgesics by reducing or eliminating their exposure to brain regions that mediate undesired side effects,” she said.

Fairbanks works extensively with U of M colleagues across other disciplines in research and in educational efforts regarding pain mechanisms and pain management. She is also connected with the national and international pain research community that is committed to addressing the global health problem of chronic pain.

Community-based Strategies

Assistant Professor Laura Palombi works directly with communities in northern Minnesota to address heroin and opioid abuse in ways that make sense for specific communities.

The increase in heroin addictions has been especially problematic in northern Minnesota, where the number of people admitted for treatment and the number of deaths associated with heroin and opioids are higher than in any other part of the state.

“What works for one part of the state doesn’t work everywhere, and each community has different strengths that they can utilize to combat the drug abuse epidemic,” Palombi said.

One community-based approach is through the Carlton County Drug Court, which is a specialized, problem-solving court program that targets non-violent criminal offenders who suffer from addiction to drugs, including opioids, heroin, methamphetamine and marijuana.

“In lieu of incarceration, drug courts use a treatment-based approach in addition to intensive supervision and judicial oversight to support chemically-dependent participants in maintaining sobriety,” Palombi said.

With colleagues in Carlton County, Palombi planned a successful Community Forum on Heroin and Opioid abuse. She is working to lead Drug Abuse Task Force efforts to reduce substance abuse in Carlton County, including educational programming for the community and a subsequent Community Forum. Palombi hopes to work with pharmacists across the state to coordinate more community-based efforts to decrease substance abuse.

Professor Carolyn Fairbanks’ goal is to refine and improve the effectiveness and safety of opioids and other analgesic medications to treat chronic pain.
The Importance of Psychiatric Medication Therapy Management

As an Associate Professor and a board-certified psychiatric pharmacist, Mark Schneiderhan has dedicated his career to improving pharmaceutical care for mental health patients.

With approximately one in five adults in the United States experiencing mental illness in any given year, pharmacists play a critical role in addressing the public health challenges associated with complex psychiatric medications.

Schneiderhan is a member of the College of Psychiatric & Neurologic Pharmacists and a practicing prescriber at the Human Development Center—a nonprofit community mental health center serving clients in Northeast Minnesota and Wisconsin. There, he works closely with psychiatrists, nurse practitioners, registered nurses, case managers, employment specialists, addiction counselors and outside primary care providers to elevate the importance of psychiatric medication therapy management.

“We have data to show that those with severe and persistent mental illness tend to lack adequate health insurance coverage or access to primary care,” said Schneiderhan. “In many cases, these are patients requiring psychiatric medications with the potential for serious health-related side effects, including weight gain and diabetes.”

Along with his colleagues and students, Schneiderhan is also involved with other initiatives to address mental health challenges, including health fairs, opiate overdose response strategies, Drug Court, and harm reduction programs such as needle exchange programs.

“The opportunities are endless for pharmacists to help address mental health issues,” said Schneiderhan. “I’m excited that today’s students are
service-minded, community-focused and dedicated to improving mental health. They see the disparities and want to address the stigma.”

**Mental Health Focus in Interprofessional Education**

In her role as Director of Interprofessional Education, Amy Pittenger has worked to establish new partnerships with Wilder Foundation and Touchstone Mental Health. At both organizations, pharmacy students complete a 10-week rotation as part of a care team focused on comprehensive medication management that doesn’t separate mental health from primary care.

“Mental health is part of overall health, and pharmacists play a key role in comprehensively caring for people with mental health issues,” said Pittenger. “We can’t do a good job of chronic disease management if someone’s mental health is not addressed. Since chronic conditions involve medications, the pharmacist is an essential member of the primary care team.”

**Behavioral Health Home**

With the leadership at Northern Pines Mental Health Center, Senior Associate Dean Randy Seifert and the organization began to define and bring to life the concept of a behavioral health home that would include comprehensive pharmacy services.

“If you have a mental illness, the team at Northern Pines is also able to provide you primary care,” said Seifert. “With a pharmacist as part of that team, he or she is able to address and manage complex medication regimens including psychiatric medications and medications for other chronic medical conditions. People with serious mental illness have a shortened life expectancy and much of this reduced life span is the result of other medical illness, especially cardiovascular disease.”

In another initiative, the college has worked with other pharmacist groups across the region to address issues of better care for patients with serious medical illness.

“Each community has slightly different needs,” said Seifert.

The college was also asked by the State Employee Group Insurance Plan to develop a depression module in its Med Edge Rx Network, which includes information on depression management and a process for assessing suicide ideation.

Seifert sees great opportunity in the college’s increasing role to help provide pharmacists with all of the tools they need to treat mental illness, including continuing professional education, mentorship and peer review support services.

“We have an opportunity to facilitate consultation to primary care pharmacists across the state,” said Seifert. “Through technology such as videoconferencing, the psychiatric pharmacists could provide consultation for issues such as drug interactions, side effects, dosing or assessment of a medication’s effectiveness.”

**Director of Interprofessional Education**

Amy Pittenger works to promote pharmacists as essentials primary care team members.

**Senior Associate Dean Randy Seifert**

has brought to life the concept of a behavioral health home.
For the past several years, the College of Pharmacy has worked with the Minnesota Pharmacists Association and the Minnesota Society of Health-System Pharmacists on the Pharmacy Practice Act Joint Task Force (PPAJTF) to seek legislative changes to the Pharmacy Practice Act that will allow pharmacists in Minnesota to practice to the limits of their education.

The task force helps guide the legislative effort to address issues initially identified by a group appointed by the Center for Leading Healthcare Change, under the chairmanship of Professor Lowell Anderson. The working group thoroughly reviewed the Practice Act for areas that would benefit from recognition of the contemporary ability of pharmacists to meet the health needs of Minnesotans.

“Of course the Practice Act has been modified many times since the original was penned, but much remains that interferes with pharmacists fulfilling the patient care roles for which they have been educated,” said Anderson.

The task force has been successful in getting changes passed over the past two legislative sessions. “In the 2014 Health and Human Services Omnibus Bill, several important pharmacy-related provisions were put into law that take us part way to our goal,” said Julie Johnson, associate dean for professional and

Randy Seifert, Marilyn Speedie, Lowell Anderson and Julie Johnson serve on the Pharmacy Practice Act Joint Task Force, which seeks legislative changes to the Pharmacy Practice Act.
external relations. “Board of Pharmacy Executive Director Cody Wiberg also played a major role in introducing and supporting the 2014 changes. We are pleased that these passed and hope it portends an easy path for the remaining changes we want to happen.”

The Omnibus Bill included language that removed barriers to collaborative practice. It passed as introduced and as endorsed by the PPAJTF. The language removes administrative hurdles that have proven cumbersome in engaging pharmacists fully in interdisciplinary teams.

The bill also included language that broadens collaborative practice authority and allows pharmacists to engage in collaborative arrangements with physician assistants and advanced practice nurse practitioners.

“This change is especially significant for rural areas where there is a shortage of primary care providers, and where increased engagement of pharmacists in the care team is essential,” said Senior Associate Dean Randy Seifert.

The bill also included compromise language negotiated by the PPAJTF, the Board of Pharmacy and the Department of Health on modifications to provisions pertaining to pharmacists’ immunization authority.

In 2015, several changes were made to Minnesota statutes that expanded immunization authority for pharmacists by allowing them to administer influenza vaccines to all eligible individuals six years of age and older, and all other vaccines to patients 13 years of age and older. Additionally, amendments regarding the use of pharmacy technicians were enacted.

The task force is now hard at work on initiatives for future legislative sessions.

“I am excited to see the professional organizations all working together to develop common language and to persuade legislators of our value,” said Dean Marilyn Speedie. “The groups are truly putting all minds to work to accomplish what is best for patients and the profession, and to enable all pharmacists to serve patients to the limits of their education and abilities.”

The task force is now hard at work on initiatives for future legislative sessions.
Leaders in Pharmacy Require Leaders in Philanthropy

The college has achieved its highest ranking ever, and philanthropy is playing a key role.

This year, the College of Pharmacy improved from its previous third place ranking to second place in the nation by U.S. News & World Report’s ranking of pharmacy programs. The second place ranking is the highest the college has ever ranked and also makes the college the top-ranked school at the University of Minnesota.

“We are very proud to be recognized as one of the best pharmacy schools in the country,” said Dean Marilyn Speedie. “The national ranking and our recent full re-accreditation showed we are strong in all three missions — research, education and service — and private gifts have played a critical role in supporting our work in these areas.”

“We are leading the way, but society asks that we do so much more,” she added, from serving the great unmet needs in healthcare for the medically underserved, to developing new and improved life-saving medicines.

Philanthropy is key to the college achieving new and even higher levels of excellence, according to Speedie. “Leaders in pharmacy require leaders in philanthropy,” she said.

Along with its high national ranking, the college has also achieved the number one endowment among the top tier research pharmacy schools. According to Speedie, this is important because there is a direct correlation between the endowment and the ranking of pharmacy schools. For instance, the top five endowed research pharmacy schools — including the University of Minnesota — are also the top five ranked pharmacy schools by U.S. News.

A strong endowment is especially important at a time in which the college’s state support is declining. Annual gift and endowment support is approaching annual state support.

“Our growing gifts and endowment is a key to our college’s continued margin of excellence,” said Bob Busch, director of development.

“Private giving has even greater impact because gifts are often targeted to address pharmacy’s grand challenges,” Speedie added. “Private gifts help make it possible for the college to lead the way on pharmacy’s big issues, from new-era pharmacist practices and our leadership curriculum, to developing new and better medicines.”

For more information on making a gift to the college, contact the development office toll-free at 866-437-0012.
Philanthropic Gifts key to Pharmacy’s Grand Challenges

A Message from the Development Office

The U of M new medicines pipeline is Minnesota’s number one life-saver over the past two decades. The college has a proven track record, more than 10 million life-years saved since the year 2000. While we’re very proud of that accomplishment, there is so much more to do. Our scientists are working tirelessly in this area, and we now have new drug development opportunities, from pancreatic cancer and Alzheimer’s, to glaucoma and anti-seizure medicines.

Support from donors has enabled the college to expand its drug development efforts through hiring additional research staff, purchasing much-need equipment and providing infrastructure to support the U of M’s new-medicines pipeline.

By investing in drug development, our donors are helping the college lead the way in the development of new medicines for many diseases, from neurological disorders and cancers, to cardiovascular conditions and infectious diseases.

The college’s new-medicines pipeline has also helped place the U among the top patent universities in the nation. Recent activity includes over a dozen patents licensed-out or spun-off, or in active commercialization.

Patent revenues from drug discovery research performed in the college have generated millions for the University. While the U’s most known patent may currently be the Honeycrisp apple, new medicines account for more than 90 percent of the U’s patent revenues over the past 20 years. That’s a remarkable return on investment. It’s also a testament to how important drug development is not just to patients, but to the University and the people of Minnesota as well.

For more information on the new medicines pipeline, contact Bob Busch at busch110@umn.edu or call toll-free 866-437-0012.
Vaccine Expert Sunil David Joins the Department of Medicinal Chemistry

Professor Sunil David, an expert in the design and development of vaccine adjuvants, joined the College of Pharmacy’s Department of Medicinal Chemistry in August 2015.

His research focuses on the discovery and development of endotoxin-sequestering molecules as potential anti-sepsis agents, modulation of innate immune pathways, and host responses to infectious agents.

“We think, perhaps naively, that we have conquered infectious diseases. But we are, of course, wrong as we have seen recently with the large epidemics of Ebola in Africa, cholera in Haiti, MERS in Korea and more,” he said. “Vaccines are an important component of how we address these emerging threats to human health.”

David became interested in vaccine development early in his career.

“Given what I had seen as a medical student and later as a physician, the potential of applying the principles of innate immune induction in vaccinology, and the potential impact on human health were obvious. I had heard the Siren’s call,” he said.

David was drawn to the University of Minnesota and the College of Pharmacy because of the breadth of research spanning from the basic sciences through translation, and all the way to clinical trials.

“The opportunities for cross-disciplinary and translational research at the U of M are extraordinary,” said David. “The Center for Immunology, the Center for Infectious Disease Research and Policy, the Clinical and Translational Science Institute, the Center for Infectious Diseases and Microbiology Translational Research, the Institute for Therapeutics Discovery and Development, and the College of Veterinary Medicine are some of the numerous world-class resources and strengths at the U. My team and I are very excited to have the opportunity to contribute to the College of Pharmacy and to the Academic Health Center.”

David received his MD and PhD degrees from the Christian Medical College in Vellore, India. He completed postdoctoral training at the Forschungszentrum in Borstel, Germany; at the Indian Institute of Science in Bangalore; and at the University of Kansas Medical Center. Prior to joining the College of Pharmacy, he served on the faculty at the University of Kansas since 2005.
College of Pharmacy Graduates

**PH.D. AND M.S. GRADUATES**

**Experimental and Clinical Pharmacology**
- Ph.D.
  - Caroline Churchill
  - Aaron Gillman
  - Mary Holmay
  - Malek Okour
  - Krista (Johnson) Sands
  - Harrison Tam

**Medicinal Chemistry**
- Ph.D.
  - Ran Dai
  - Elbek Kurbanov
  - Yang Li
  - Li-Kai Liu
  - Margaret Olson

**Pharmaceutics Ph.D.**
- Ameya Kirtane
- Frederick Osei-Yeboah
- Shruthi Vaidyanathan

**Social and Administrative Pharmacy Ph.D.**
- Reid Smith
- Maggie Kading
- Weiping Su

**Social and Administrative M.S.**
- Megan Born
- Kristin Showen

**PHARM.D. GRADUATES**

- Daniel Addis
- Holly Lynn Ahnen
- Michelle Massey Anderson
- Kenechukwu Chizu Anwah
- Ashley Elizabeth Artmann

- Jon Thomas Athmann
- Christina Marie Atkielski
- Amy Lynn Awker
- Lindsey Dena Baumgartner
- Laurel Elizabeth Beck
- Andrea Lynn Bell
- Wesley James Bickler

- Nicole Bliss
- Beau Karl Blumenschein
- Faustina Boa-Amponsem
- Maud Boateng
- Elise Maria Bohm
- Jason Brule
- Carrie Cai
- Alina Cernasev
PHARM.D. GRADUATES (CONT.)

Jason Chan
Tiffany Yeun Yee Chan
Wing Chan
Christopher C. Chiejina
Catherine Chung
Emily Jane Coler
Julie Ann Corradi
Kayla Lynn Curtis
Caitlin Marie Dado
Alyssa Mae De Castro
Daniel Delaney
Melissa Marie Derner
Sarah Kae Derr
Carly Rae Dukart
Aaron G. Ernestberger
Seenae Eum
Matthew Allen Falk
Liyan Feng
Lindsey Jo Firman
Joy Marie Flugge
Erin Ashley Frigo
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New Faculty

Sunil David
Medicinal Chemistry
Research interest: vaccine adjuvant design and development

Yao Yao
Pharmacy Practice and Pharmaceutical Sciences
Research interests: neurobiology, stroke, neuropharmacology, and stem cell biology

Amanda Klein
Pharmacy Practice and Pharmaceutical Sciences
Research interest: the neural mechanisms of pain

Beshay Zordoky
Experimental and Clinical Pharmacology
Research interests: cardio-oncology
## Financial Information

### Sources for Fiscal Year 2015 (in millions)

<table>
<thead>
<tr>
<th>Source</th>
<th>FY 2015 (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition &amp; Fees</td>
<td>23.4</td>
</tr>
<tr>
<td>State Support</td>
<td>5.5</td>
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<tr>
<td>Royalties</td>
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<tr>
<td>Gifts &amp; Endowment Income</td>
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<tr>
<td>Indirect Cost Recovery</td>
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<tr>
<td>Grants &amp; External Sales*</td>
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<tr>
<td>Transfers (Net)</td>
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<td>Sponsored (Direct)</td>
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<tr>
<td>Total Sources</td>
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</tr>
</tbody>
</table>

*Includes accounts receivable and deferred revenue.

### Uses for Fiscal Year 2015 (in millions)

<table>
<thead>
<tr>
<th>Use</th>
<th>FY 2015 (in millions)</th>
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</thead>
<tbody>
<tr>
<td>Salaries &amp; Benefits</td>
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<tr>
<td>General Lab Supplies</td>
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<tr>
<td>Consulting Services</td>
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<tr>
<td>Student Assistance</td>
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<tr>
<td>Equipment &amp; Facilities</td>
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<tr>
<td>Central Assessments</td>
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<tr>
<td>Total Uses</td>
<td>52.8</td>
</tr>
</tbody>
</table>
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The College of Pharmacy inspires and educates current and future pharmacists and scientists, engages in cutting-edge research and leads practice development to improve the health of the people of Minnesota and the world.

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