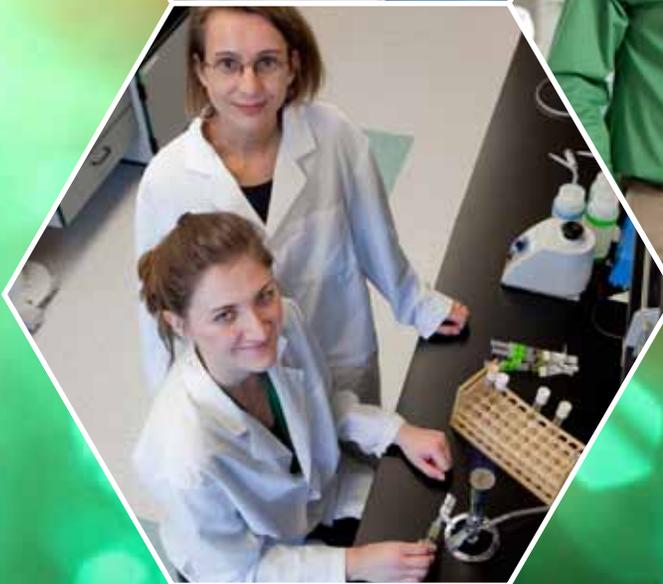


INNOVATIONS IN HEALTHCARE





WHY HEALTHCARE?

More than \$2 trillion is spent each year on healthcare in the United States. The coming decade is certain to see advances in areas ranging from personalized medicine to electronic medical records, and Binghamton University researchers are poised to contribute innovative ideas to this vital field.

RESEARCH THAT TRANSFORMS LIVES



Binghamton University researchers direct their innovative energies to advancing healthcare every day. Faculty members have contributed to breakthroughs in cancer detection, child mental health, Parkinson's disease treatment and medical devices, to name just a few projects. Our laboratories put new therapies to the test, our nurse-educators develop better treatment regimens and our engineers and management experts consider how to run hospitals more efficiently. Now, they're coming together to form exciting new collaborations with each other, with researchers from other schools and with healthcare facilities.

These partnerships promise to improve our quality of life, lead to economic development in Greater Binghamton and beyond, expand the University's research portfolio and raise its national profile. By capitalizing on its historic strengths in fields ranging from psychology to mechanical engineering and from nursing to leadership, Binghamton University can give new meaning to an old nickname for this region: The Valley of Opportunity.

Healthcare is one of several transdisciplinary areas of excellence that will guide Binghamton University's faculty hiring during the next several years. It has also been identified as a priority by SUNY Chancellor Nancy Zimpher and by Timothy Killeen, president of the Research Foundation and SUNY vice chancellor for research. By working across disciplines and across institutions — and by aligning our educational and research missions — we can maximize our impact on the quality, availability and affordability of healthcare for all New Yorkers. Together, we will ensure that the latest innovations in healthcare travel speedily from the lab bench to the bedside.

ALZHEIMER'S AND PARKINSON'S

Patricia Di Lorenzo explores “temporal coding” in the brain using the taste system as a model. She believes a better understanding of neurons' communication may hold answers for patients with diseases of neural transmission such as Alzheimer's and Parkinson's. It could also help in the development of brain-machine interfaces like artificial limbs.

INTEGRATED HEALTH SERVICES

An interdisciplinary team is developing, implementing and evaluating school-based health and mental health services in two Binghamton elementary schools. Through this project, nurses, social workers and educators collaborate to improve physical, mental health and educational outcomes for children and families served by the schools.

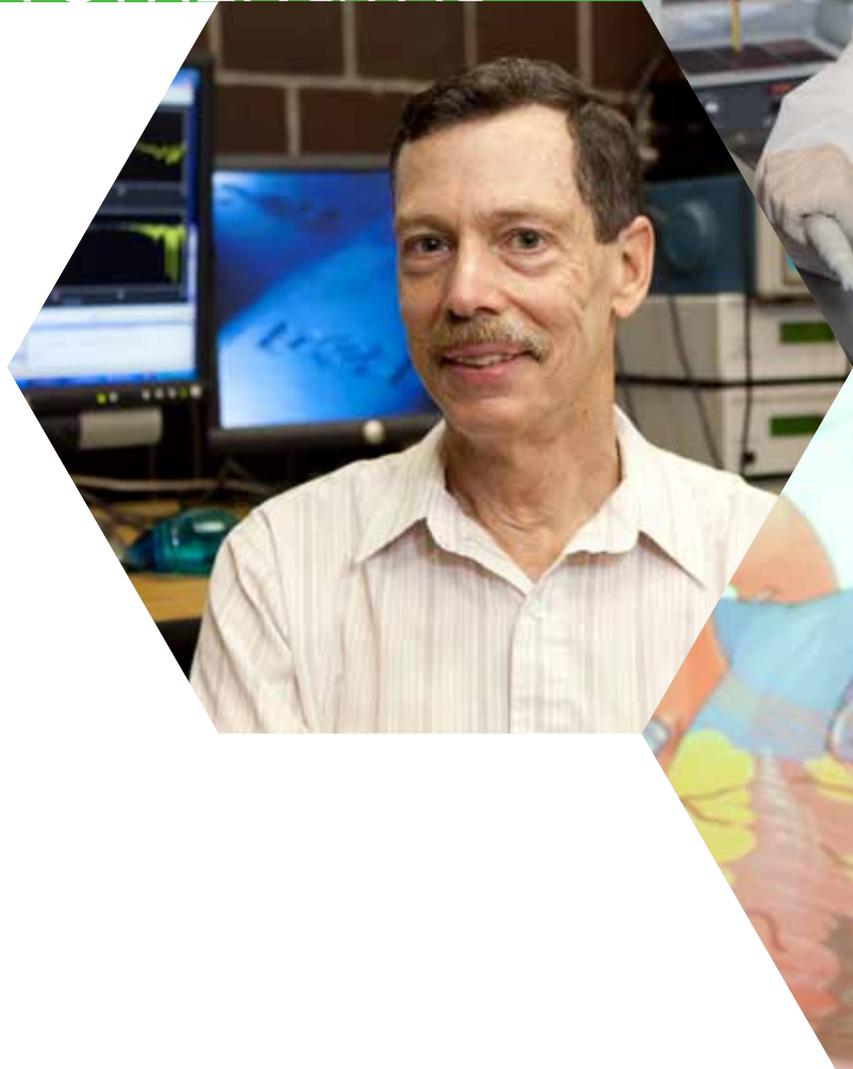
BETTER BANDAGES

What if a bandage could do more than just cover up a wound? What if it could help you to heal by dispensing medicine and scrubbing away bacteria? What if this technology were so cheap you could throw it away when you were done? Answering these questions and many others is the task facing an interdisciplinary team of Binghamton researchers and graduate students who focus on the medical applications of flexible electronics.

BUILDING ON OUR STRENGTHS

HEARING LOSS

Ron Miles' research aims to dramatically improve the ability of the hearing-impaired to understand speech in noisy environments. A mechanical engineer, Miles has used a tiny structure found in the ear of the *Ormia ochracea* fly as a model to develop the world's smallest directional microphones. Working with an interdisciplinary team in a state-of-the-art laboratory, Miles and his colleagues have modeled, designed, fabricated, tested and analyzed tiny biomimetic sensors based on the fly's ears. Their discoveries, which have been supported by millions of dollars in funding from the National Institutes of Health and National Science Foundation, could help the more than 28 million Americans who suffer from or face imminent hearing loss.



RURAL HEALTHCARE

The O'Connor Office of Rural Health Studies supports rural healthcare and research in Delaware and surrounding counties. The office, directed by Mary Muscari, promotes heart health in rural women, raises awareness of the risk of stroke, helps to identify healthcare needs in rural areas and helps to design nursing strategies to meet those needs.

CHILDHOOD DEPRESSION

Brandon Gibb's research could provide new weapons for the fight against childhood depression. He leads several studies that will help experts develop a better understanding of the genetic, environmental and psychological variables that can lead to depression.

HIV/AIDS

Leo Wilton's research addresses the disproportionate HIV/AIDS infection rate among people of color. Wilton, an associate professor of human development, has studied body image and how it interfaces with HIV risk behaviors among black gay men. He focuses on individual behavior as well as on outside factors such as poverty and access to healthcare.





ADDICTION

Research conducted by Linda Spear, a pioneer in charting the biology of adolescence, demonstrates that adolescent alcohol consumption may have a lasting effect on the brain, possibly setting the stage for addiction in adulthood. A neuroscientist, she is credited with helping to ground the debate about teen drinking in solid science. Spear and more than 15 colleagues at Binghamton, SUNY Upstate Medical University, Cortland State and the University of Maryland conduct studies through the Developmental Exposure Alcohol Research Center, or DEARC. Funded by the National Institutes of Health, it is the only research center in the nation to focus on how alcohol affects brain development.



HEART DISEASE

Pamela Stewart Fahs' research helps to fight America's No. 1 killer: heart disease. Stewart Fahs, professor and Decker Endowed Chair of Rural Health Nursing, has studied ways to improve heart-healthy behaviors among rural women. She's interested in using community intervention methods as well as nursing intervention techniques to build awareness and change behaviors. While rural women may not be at higher risk for cardiovascular disease than the rest of the population, they do face particular challenges. For instance, they were among the last groups in the country to start smoking — and they're among the last to quit. Rural women may also have a harder time accessing healthcare and messages about healthy habits than suburban or urban women.

EMERGING DISEASES

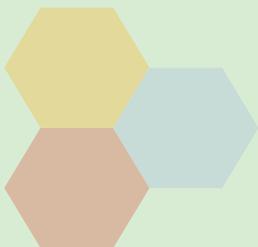
Emerging diseases such as swine flu are among the most far-reaching consequences of climate change. Florence Margai advocates for a geographically based framework to identify vulnerable places and at-risk populations. Her plan highlights the need for partnerships with health professionals and policymakers.

CANCER

Chemist Susan Bane and biologist Susannah Gal collaborate on research that could lead to targeted cancer therapies. With support from the National Institutes of Health, they're studying microtubules, which help give a cell its structure and also help chromosomes line up during cell division. Bane and Gal are working on a system that could lead to more aggressive treatment for certain tumors.

CHRONIC INFECTION

Members of Binghamton's Biofilms Research Group have made several important discoveries related to the formation, development and dispersion of biofilms, communities of bacteria in self-produced slime. Biofilms are implicated in more than 80 percent of chronic inflammatory and infectious diseases caused by bacteria, including ear infections, gastrointestinal ulcers, urinary tract infections and pulmonary infections in cystic fibrosis patients.





“Advances in healthcare, including new treatments and more efficiently run hospitals, can improve the way we live. Binghamton University researchers can contribute even more to these efforts by collaborating across disciplines to speed the process of discovery.”

Bahgat Sammakia
Vice President for Research

NEXT STEPS

- A faculty team will help to identify Binghamton's existing strengths in healthcare research as well as gaps in staffing that must be filled to facilitate interdisciplinary work. Faculty hiring will be directed accordingly.
- Investments will be made to improve campus infrastructure as needed to support healthcare projects.
- University leaders are exploring additional partnerships with healthcare institutions such as SUNY Upstate Medical University and its Binghamton Clinical Campus, United Health Services, Lourdes Hospital and the Mayo Clinic.



BETTER HOSPITALS

Researchers affiliated with the Center for Emerging Technologies in Healthcare have studied total quality management for healthcare facilities; scheduling and operational control; continuous healthcare improvement for women veterans; and new technologies for automated drug dispensing.

PARKINSON'S DISEASE

Christopher Bishop has a novel theory about how to suppress the involuntary movements associated with Parkinson's disease. His idea could revolutionize the way patients respond to the drug that has been the gold standard in treating the disease for more than 50 years and lead to vast improvements in the quality of life for the roughly 1 million Americans who suffer from Parkinson's.

CANCER

Yulong Chen's research explores the mechanism that allows an opioid — the key ingredient in pain killers such as morphine — to kill cancer cells. The biologist's work on molecular signals in neurons and his research on cancer cells may one day help him identify an opioid that reduces pain in cancer patients, doesn't cause side effects or addiction and kills tumors.



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