SHARING SOLUTIONS

NC State continues its commitment to moving research results to the marketplace with six projects funded by the 2013 Chancellor’s Innovation Fund, or CIF. “The range of topics reflects the diversity of real world issues that our research teams tackle,” says Kelly Sexton, Office of Technology Transfer director.

MONITORING YOUR SLEEP

Getting a good night’s sleep is important. NC State engineer Alper Bozkurt has developed new technology to help researchers detect and understand sleep disorders by monitoring blood flow in the brain.

The SleepiBand, developed in Bozkurt’s iBionicS lab, is a wireless headband that contains sensors to monitor bloodflow and the oxygen level in the blood using near-infrared light. The headband units also include a power supply and radio to send the monitoring data to a laptop or a smartphone. Bozkurt is collaborating with researchers in Duke Medical Center’s Sleep Disorders Laboratory and will be using his CIF award to initiate clinical testing of the SleepiBand.

PREDICTING CANINE CANCER OUTCOMES

Canine lymphoma is one of the most common cancers in dogs — with an estimated 300,000 cases reported each year. Without treatment, this cancer is usually fatal within three months of diagnosis. Chemotherapy is usually effective, with most dogs entering remission and around 50 percent living for at least nine months. However, the high cost of treatment and the lack of a reliable prognostic test for individual cases means that most dogs don’t get treated. Genomics professor Matthew Breen has developed a genetic test that is faster and more cost-effective than those currently in use. The test can predict how long a dog with lymphoma will respond to chemotherapy, allowing dog owners to make informed decisions about what is best for their pets.

“CIF funding will allow us to validate the new test on a series of patient samples and prepare it to be offered broadly to veterinarians,” Breen says.
TREATING CANINE ALLERGIES
Humans aren’t the only ones who suffer from allergies to dust mites and pollens. Dogs get them too. The most common treatment for canine allergies — corticosteroids — can have side effects such as increased thirst, appetite, weight gain and predisposition to infections. But immunologist Bruce Hammerberg and dermatologist Thierry Olivry are working on a new therapy for canine allergy sufferers that will give relief without the side effects.

The therapy is based on mouse antibodies that bind to and neutralize the antibodies that activate allergic cells. A similar therapy for human allergic asthma has been on the market for years. The researchers will use their CIF funding to create a canine version of this antibody that they anticipate will give dogs long-term allergy relief, without the side effects.

IMPROVING RFID SYSTEMS
Radio-frequency identification (RFID) systems use centralized readers to collect data from small tags, which can be attached to a wide variety of electronic sensors. But the use of RFID tags has been limited by the fact that they need to be within 5 to 10 meters of a reader to work. Until now.

A research team led by engineering professor Paul Franzon — and including NC State students Peter Gadfort, Josh Ledford and Shep Pitts — has developed circuit technology that will allow the creation of RFID tags that can operate at greater distances from RFID readers. And, because the technology requires less silicon, they will be less expensive to produce than existing RFID tags. “We’ll be using the funding to validate the performance of our circuit technology and to develop technical plans for incorporating the technology into RFID tags,” Franzon says.

HARNESSING PLASMA POTENTIAL
Engineers are trying to harness “lightning in a bottle”— also known as plasma technology — to treat water without using chemicals. Potential uses range from removing contaminants in drinking water to fertilizing crops in the developing world with plasma-treated water.

Plasma, the fourth state of matter, is created when a gas is energized and its electrons break free. The sun contains hot plasma. Engineering professors Steven Shannon and Detlef Knappe are working to bring non-thermal plasma technology to the market. Look in their lab right now and you’ll see a golf-ball sized orb of glowing air. They’re hoping plasma technology has the potential to go the distance, as they improve energy efficiency through innovation in reactor design enabled by CIF.

TRACKING GRAD SCHOOL INFO
Keeping track of all the information required to apply to graduate school — the test scores and academic records, CVs, recommendations and especially the deadlines — can drive any applicant around the bend. But Anita Flick has a web-based solution that not only helps students track their applications and acceptances but also helps advisors check student progress toward academic goals.

Director of NC State’s health professions advising center, Flick calls her solution, FolioFiler, the “helicopter parent without the parent.” FolioFiler is flexible enough to be used for applications to any type of professional school or even for job applications.