THE ISSUE
At one end of the family planning spectrum: thousands of women lining up for assisted reproduction because they cannot conceive naturally. At the other end: an even higher number who get pregnant at the drop of a hat—accidentally or not. Their fertility or lack thereof is the result of science’s limited understanding of female reproductive biology.

“To address both infertility and contraception, we need to understand in much more detail how the ovarian follicles develop each month and how the dominant follicle releases the egg,” says Roger Pierson, U of S professor of obstetrics, gynecology and reproductive sciences.

THE CHALLENGE
Human female reproductive organs lie deep inside the body, far beyond the reach of practical and ethical research.

“Because invasive techniques are out of the question, we’ve had to make do with indirect research based on circulating hormones to guide our knowledge,” he says.
THE RESEARCH

Pierson was the first to use ultrasound to directly visualize human ovulation.

Using a vaginal probe to approach within an unprecedented one centimetre of the ovaries, he created images with little interference from surrounding tissue and at a much higher resolution than previously available. This advance, along with computerized analysis systems he designed to obtain the images, made it possible to study—non-invasively—how the ovaries and ovulation work and correct some centuries-old misconceptions.

Funded mostly by the Canadian Institutes of Health Research, Pierson is using these tools to detect pathological changes (cancer) in the ovaries much earlier than the traditional pelvic exam. He is working with computer scientists and physicians to bring the technology to the family physician’s office. He also uses magnetic resonance imaging (MRI) and ultrasound to find what makes the uterus accept or reject an embryo. This knowledge could lead to safer, more effective contraception.

Pierson’s work at his Women’s Health Imaging Research Laboratory has been enabled by the co-location of U of S’s medical and veterinary schools. Pierson and his veterinary colleagues have developed near-perfect modelling systems using cows and mares, both far superior than previous models, to inform research into human reproduction, making the U of S a world leader in this field.

THE IMPACT

In 2003, Pierson uncovered evidence suggesting that the traditionally accepted model of the human menstrual cycle is wrong. Chatelaine magazine recognized this discovery with the 2003 Women’s Health Hero Award and Discover magazine ranked the results among the top 100 science stories of the year.

That discovery led to new, safer and more effective contraceptives and rethinking of the protocols for how human eggs are collected for in vitro fertilization around the world. In Canada alone, over 9,000 such procedures are performed every year. This in turn has led to greater success for women who are having trouble conceiving.

Pierson’s on-going research promises to reduce the cost to the patient of ovarian stimulation procedures and increase the chance of successful conception.

His research has also led to new contraceptive delivery systems such as the contraceptive patch and an intra-vaginal hormonal contraceptive device.

Working with pharmaceutical companies, Pierson designed and executed multi-national clinical trials in humans assessing the contraceptive effects of the transdermal patch, the intra-vaginal hormonal contraceptive device, and extended dose regimens of oral contraceptives, all based on his research. Further, the U of S was the world trial site for his study addressing infertility using recombinant luteinizing hormone.

“There is really no place in the world where this kind of research comes together—except the U of S,” he says.

For more information on Pierson’s work, visit: www.medicine.usask.ca/education/graduate-studies/programs/health-sciences/graduate-supervisors/pierson