

New tool enhances view of muscles

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Simon Fraser University associate professor James Wakeling is adding to the arsenal of increasingly sophisticated medical imaging tools with a new signal-processing method for viewing muscle activation details that have never been seen before.

“We’re poised to start making new observations and insights,” he says, “and to do new experiments that haven’t been possible before.”

Provided by Simon Fraser University

Fascinated with the mechanics of [muscle movement](#) in people and animals, Wakeling has developed a novel method using [ultrasound imaging](#), 3D motion-capture technology and proprietary data-processing software to scan and capture 3D maps of the [muscle structure](#) — in just 90 seconds.

It’s a [medical-imaging](#) breakthrough because previous methods took 15 minutes to do the job—far too long to ask people to hold a muscle contraction.

The key to the breakthrough is the way the software processes the data, says Wakeling, who teaches in SFU’s department of Biomedical Physiology and Kinesiology. He developed the software with graduate student Manku Rana.

“Now, we can get people to do muscle contractions and we can actually see how the internal structure of the muscle changes,” he says.

Wakeling’s goal is to improve the muscle models used in musculoskeletal simulation software that predicts how people move and the forces on their joints.

Current packages are missing important information about muscle contraction, such as how the muscle shape changes, how it bulges, or how the internal muscle fibres become more curved—all details that Wakeling’s technology can capture.

Wakeling hopes his research will ultimately lead to new software programs for predicting the outcome of orthopaedic surgeries such as tendon-transfers for treating conditions like cerebral palsy in children.

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