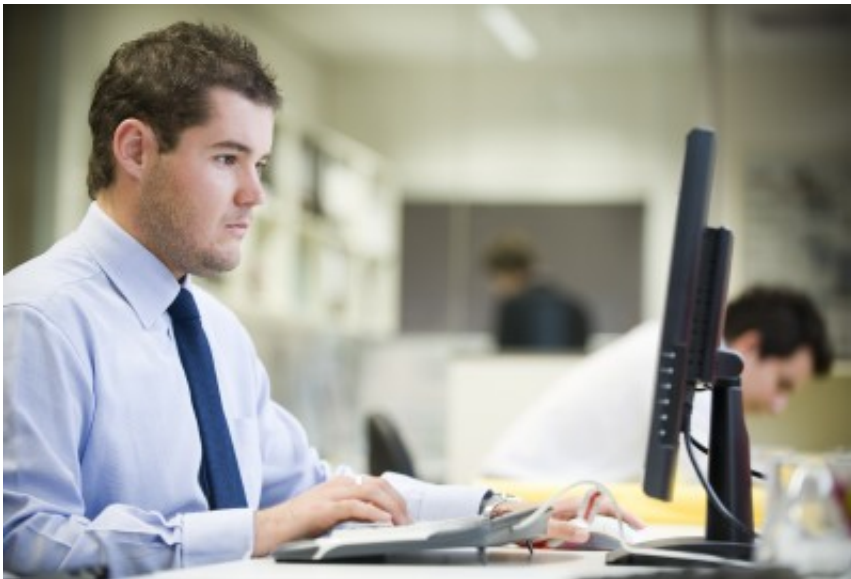


New smart chair technology to improve health of workers

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Researchers have designed a smart chair that will make the office and workers safer and healthier.

In Australia, a 2007 study by Access Economics estimated back pain was costing the [economy](#) \$34.3 billion in lost [workplace productivity](#) and treatments.

The emphasis on OH&S is to take preventative measures, such as keeping chairs, desks and computers at the right height.

However, Dr Stephen Jia Wang at Monash, has developed office furniture that will be able to tell the worker whether they are sitting correctly, when it's time to get up and move around and, even, "inform" your home furniture of how your spine has been coping during the day and to alter your sofa's comfort settings before you sit down in front of the TV.

Monash University researcher Dr Wang's current "smart chair" project is expected to be a fully functional prototype as early as 2017.

Director of the Monash University's International Tangible Interaction Design Lab, Dr Wang says his own back pain – and his expensive search for a good office chair – was the inspiration for what he calls a "pervasive environment simulator" or "the virtual spine".

The technology combines interaction design, gaming and physical computing technology, data analysis and health measurement.

"Something needs to be done immediately to ease the negative productivity impact caused by musculoskeletal conditions like debilitating back pain which now ranks with diseases such as cancer, diabetes and heart disease as national health burdens, particularly in industrialised countries," Dr Wang said.

For Dr Wang it makes a compelling case for a chair that proactively dictates healthy workplace posture.

At this stage, Dr Wang's test chair still looks like an ordinary office chair with a spaghetti of electrical wires running between a central system and 78 pressure sensors in the chair's seat and backrest pads. Benefits from the in-depth understanding of spinal health, the finished design will be extremely ergonomic, beautifully designed and wireless.

The sensors in this unique chair detect the varying loads exerted by a person's back and legs as they sit. This information is logged, analysed and compared with "ideal" spinal positions. Then, after the individual user's anatomy, usual posture and current problems have been factored in, the central system sends out advisory texts or emails to correct bad posture – not only in the office but also in the home.

Volunteers are now helping test the chair by spending one workday with movement monitors attached to their spines while they sit in the test chair. This provides baseline data that will enable chair sensor data to be calibrated against actual spine positions. In the second phase of the study, the test chair will provide users with feedback, and its effects on users' sitting habits and posture will be monitored.

Research team member Professor Jenny Keating, from the Monash Department of Physiotherapy, says sitting postures may not be easy to change without sustained feedback: "The chair offers the potential to study posture adaptation in response to individualised feedback. It could provide a system for effective posture re-education that is integrated with our work life, and help us protect our joints from sustained end of range loading, or body configurations that cause [pain](#)."

Dr Wang has filed a PCT (international) patent for the invention, which also won a 2013 Pro Vice-Chancellor's Interdisciplinary Research (IDR) seed grant. Parallel with clinical trial support from two of Australia's leading medical service groups, Monash Health and Austin Health, the project is also being supported financially by a Beijing-based architectural engineering firm that expects to be manufacturing the smart chair commercially by 2020.

Provided by Monash University

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