

iMPACT

Demonstrating the return on our investments
in faculty-based research



Dr. Christoph Sensen, Department of
Biochemistry and Molecular Biology
at the University of Calgary

Caveman is a Pioneer in Virtual Medicine

By Ashley McCarl

The medical field is full of three-dimensional models to help health professionals and researchers understand how the body works, and why it reacts the way it does. But none have taken the next step into the fourth dimension...until Caveman.

Researchers at the University of Calgary say they have unlocked the key to time with their latest innovation in virtual medicine, a virtual reality model called Caveman, named after the base software and the early humans. Prof. Christoph Sensen of the Department of Biochemistry and Molecular Biology led the team that created Caveman, by adding a fourth dimension that simulates real-time activities including a beating heart, flowing blood and breathing.

The model, which is already being used in research, will allow users to see the effect and response of various developmental functions and diseases on the body.

"There has never been a generic model that works for everything," says Sensen. "Caveman is the first object-oriented human body in the world."

To lay the foundation for the model, Kasterstener Inc. in Red Deer, Alberta created more than 3,000 components of the body including organs, muscles and bones. Sensen's team then built software, which allows users to select any part of the library for viewing. For example, to look at muscles and organs, the user can "remove" the skin and skeleton to better focus on the desired areas.

Sensen, who graduated with a Ph.D. in biology from the Universität zu Köln in Germany, credits his unique blend of

experience and non-medical background as the platform that allowed him to produce Caveman. His experience allowed him to have a fresh perspective of medicine and instead of focusing on just one element of the body, he focused on the entire thing.

Caveman has taken what Sensen describes as "six-and-a-half long, tedious years" to create, and it holds potential for huge applications. This human body model provides the tools to study metabolic functions and map gene expressions in ways that previously could not be studied in their entirety.

It also shows how various nutrient and protein concentrations in the internal organs change as a result of external factors.

The Calgary team has linked up with four projects across Canada to use Caveman to explore some of the diseases affecting Canadians, including multiple sclerosis, facial defects, obesity and metabolism. Sensen says research into other diseases such as diabetes and Alzheimer's could be up next.

"Caveman is an atlas that will help understand responses and behaviours for everything from diseases to normal body functions," says Sensen.

Caveman may also be used by students for surgery practice. It provides the opportunity to gain experience operating on a "live" human because Caveman, unlike cadavers, is modeled to react as a real human body would under the knife.

Funding for this research was provided by Western Economic Diversification and the Province of Alberta's Advanced Education and Technology Ministry through the Western Economic Partnership Agreements program, Genome Canada, Genome Alberta and the National Research Council's Industrial Research Assistance Program.

"Caveman is
the first object-
oriented human body
in the world."



AFMC

The Association of Faculties
of Medicine of Canada

View more editions of iMPACT on our website at www.afmc.ca

265 Carling Avenue, Suite 800, Ottawa, Ontario K1S 2E1 | Tel: (613) 730 0687 | Fax: (613) 730 1196

WWW.AFMC.CA

Printed November 2007