

Alumnus is USA magazine's innovator of the year

Prof Hans van Leeuwen, professor in Environmental and Biological Engineering at the Iowa State University, was named R&D Magazine's Innovator of the Year for 2009. Furthermore, the research team he heads received an R&D 100 Award from R&D Magazine in the United States last year, as well as in 2008. This is a remarkable achievement.

Prof Van Leeuwen was recognised for his work to use microscopic fungi to improve the production of biofuels, as well as other inventions to protect the environment and improve water quality. This graduate and former staff member of the University of Pretoria's Department of Chemical Engineering is also President of MycoInnovations in Ames, Iowa, and Vice-President of Mello3z in Cedar Rapids, Iowa. With these ventures, he makes significant contributions to turning waste into profitable products. Mello3z has developed technology for purifying alcoholic beverages.

His MycoMax process, for which his team received the 2008 R&D 100 award, is already making inroads in the ethanol industry. The researchers' goal was to improve the efficiency of maize-to-ethanol productions, while producing a food-grade, high-protein fungus to supplement animal feed. Based on a rather useless coproduct, stillage from ethanol is benefited by this fungal cultivation invention. The fungal product is a valuable supplement in animal nutrition, and provides probiotics, enzymes, vitamins and disease resistance to animals. It may ultimately become an important supplement for humans and could save millions of lives lost through malnutrition in developing countries.

Prof Van Leeuwen's more recent development and the reason for his 2009 R&D 100 award is the mycofuel process, which could allow the world's oil needs to be met from waste. The research team studied how a fungus can be used to convert waste from biomass processing to biodiesel. "Biodiesel production from traditional oil-rich crops is limited by land availability, climate, and environmental and social issues regarding the use of feed and food crops for fuel", Prof Van Leeuwen said. "This method of producing biodiesel is green, sustainable and doesn't compete with food crops."



→ *Hans van Leeuwen, Iowa State University professor and R&D Magazine's 2009 Innovator of the Year.*
Photo by Bob Elbert.

An earlier invention of Prof Van Leeuwen, an ozonation process that prevents the introduction of exotic pests via ships' ballast water, is now being commercialised in the USA and Korea. He also developed water reclamation technology involving ozonation and granular activated carbon from industrial and domestic wastewater sources. He has four USA patents to his name, with four more pending and 15 international patents.

The R&D 100 Awards, run by the USA R&D Magazine, identify and recognise the 100 most significant new research and development advances in various fields. The awards honour "the people behind some of the greatest innovations and discoveries in science," and the *Chicago Tribune* once called them the "Oscars of Invention". People who were previously honoured as innovators of the year include Elon Musk (also an alumnus of the University of Pretoria), developer of cost-effective manned spacecraft, Tesla electric cars, and PayPal, Dean Kaman, the inventor of the Segway Personal Transporter and founder of the first organisation that works to inspire children to study science and technology, and Larry Page, co-founder of Google. 🌐