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Tailor-made solutions

Scientists at the Biorefining Conversions Network are developing microorganisms that can efficiently convert forest and agricultural plant materials (known as biomass) into a wide range of useful products.

Since its creation in 2009, the network has brought together insights from biology, chemistry, and engineering. Dr. Mike Ellison, a scientist at the University of Alberta and a principal investigator at the network, is harnessing this knowledge by using biological tools to engineer microscopic organisms with exciting possibilities.

Dr. Ellison's focus is synthetic biology, an emerging field that combines biology and engineering. The network attracted $500,000 in private capital when it was first established for work in this field, and Dr. Ellison says early successes are helping attract more funding and collaborations from the commercial world.

"I think Alberta made an enormous step in recognizing the importance of synthetic biology," says Dr. Ellison, noting that the province invested $3 million to create the Biorefining Conversions Network.

One of the network's projects focuses on the rapid assembly of gene components into complex gene circuits. "We can then apply this technology to certain microorganisms and find ways to make products of value, such as biodiesel and butanol. In addition, we can have the microorganisms exhibit extreme tolerance to organic solvents so they can be used effectively in the production of biofuels," Dr. Ellison explains.

Synthetic biology is gaining credibility around the world, with regions using their own biomass resources to address their own needs and challenges, which could include energy and chemical supplies, waste reduction, and environmental remediation.

"Synthetic biology allows us to specifically deal with our own problems in a rational way, right here with our own resources," says Dr. Ellison. "It's a means of tackling our issues with tailor-made solutions."

Dr. Mike Ellison receives support through Alberta Innovates – Bio Solutions.

Photo: Dr. Mike Ellison

For more information on Alberta's research and innovation system go to the Alberta Innovates website at www.albertainnovates.ca