TGIF Taking Great Ideas Forward

Improving Northern Capital - Sustainable Development in the Northern Tier

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"The pessimist sees difficulty in every opportunity. The optimist sees opportunity in every difficulty."

-Winston Churchill-

MEETINGS and EVENTS:

Links will provide additional information. Dates for recent additions are in **bold**.

What	*Date*	*Time*	*Where*
Biodiesel Study Group	Mondays (all)	7:00-8:30 PM	Washburn Library
Agriculture Businesses	Nov. 28th	9:00 – 4:00 PM	Madison
Innovation Master Class	Dec. 5-6	All Day	Madison
Managing Visitor Use in Coastal Areas – Reservation Required	**Dec 5-6**	All Day	Duluth - US EPA Conference Center
Environmental Summit 07	Dec. 5th	8:30-2:30	Green Bay – St.Norbert College – Bemis Center
Inventors & Entrepreneurs Club	Dec. 6th	6:00pm	Iron River
BCEDC Board Meeting	Dec. 10th	10:00 am	Washburn Library
Superior Days Planning	Dec. 11th	Noon	Superior – The Shack
Global Marketplace Conference	Dec. 10-11	All Day	Los Angeles, CA
EcoBuild 2007	Dec. 10-13	All Day	Washington DC
Superior Days Planning	Jan. 8th	Noon	WITC - Superior
Superior Days	Feb. 26-27	All Day	Madison
Fusion 2008	**March 5-6**	All Day	Madison, Fluno Center
Green By Design Conference	June 12-13	All Day	Washington DC area

CLIMATE – BIOLOGICAL SOLUTIONS?

Immense funding is made available to cure the "diseases of rich people" such as cancer and heart disease, says Physicist and Nobel laureate Dr. **Steven Chu**. "If we can't cure cancer in 50 years," he says, "it will be tragic but life will go on. But if we can't develop carbon-neutral fuel sources, life will change for everyone."

It has been amazing to observe, over just the past few months, how there has been a shift in the conversation about climate change from methods of mitigation to actions for adaptation. The "likely" has been replaced by the "inevitable" in the minds of many.

Chu, now head of the **Lawrence Berkeley National Laboratory**(LBNL), urges scientists to turn their attention to finding an environmentally friendly form of fuel. He makes an interesting case that termite guts may hold a key. A billion years of evolution have produced a highly efficient factory for turning cellulose into ethanol; a factory unlike anything that humans can yet design. By exploiting these tricks, says Chu, biology can used as a solution to a pressing world problem.

At LBNL, Chu leads an elite corp of scientists including over 50 members of the National Academy of Sciences. His challenge there has been to convince these scientists about the size and scope of the problems global climate change will generate going forward. He says he is making progress. Operated by the **University of California – Berkeley**, LBNL is funded by the **US Department of Energy** and has significant support from **British Petroleum**(BP). These scientists don't lack for resources.

A new technique in molecular biology, ***metagenomics***, is being used to reverse engineer the metabolic pathways in the gut of termites to discover how complex carbohydrates in lignocellulose are converted into simple sugars. It is estimated that the gut of a typical termite harbors a cluster of over 200 different species of microbes. Trying to tease out the role of each species in the complex steps is daunting. Past practice called for isolating cultures of each organism and then studying its individual metabolism by meticulously extracting the enzymes that control each chemical reaction step in the metabolic pathway. Well established techniques of molecular biology enable scientists to work backward from the enzyme's protein and build a piece of DNA. Metagenomics looks on the whole cluster of termite gut microbes as an ecosystem, almost like a single organism, and pulls DNA from the cluster rather than each species. The result is a more rapid access to the genetic directions for making the critical enzymes that speed up the chemical conversions.

A goal of the research is to discover a means to capture the enormous energy of hydrogen contained in these complex molecules. Living organisms have mastered and elaborated on the mechanisms for billions of years. The termite is a highly efficient bioreactor. From the energy in a single sheet of paper, the ecosystem that is the gut of a termite is calculated to be capable of producing two liters of hydrogen. Figuring all of this out is not for the timid types among microbiologists and biochemists. But as Chu says, there may not be more important work in biology.

US Department of Energy Joint Genome Institute(JGI). Page on termites Termite Power from the DOE Web site provide some useful insight as to the possibilities.

LIGHTER SIDE:

As with most jokes the original author is unknown. Whoever you are; “Thanks!” Names, when added, are intended to tease the innocent.

> Three freshman engineering students were sitting around one day arguing about who might have designed the human body. The first one said, "It must've been a mechanical engineer. The human body has all those levers and pivots and stuff - a mechanical engineer must have designed all that."
>
> The second one said, "No, it had to have been an electrical engineer. The complex way the nerves are wired up to the brain must have been designed by an electrical engineer."
>
> Then the third one said, "No, it was a civil engineer. Who else would have run a waste water line through a recreational area?"

Take care and have a great weekend!

/BRUCE

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Bruce Lindgren is Principal of B.Lindgren CONSULTING. ***The consulting practice serves small business, local government, school districts and non-profits providing support for research, grant development, technical writing, marketing support and project management. Bruce brings his background in biological sciences, education, small business and media technology to generate and implement ideas contributing solutions to mission critical challenges.***

In addition Bruce maintains the following affiliations:

Bayfield County Economic Development Corporation, **(BCEDC)** ***Director***

Inland Sea Society, **(ISS)** ***Director***

Lake Superior Binational Forum, **(LSBF)** ***US Delegation Co-Chair***

Raindrop Garden Gallery, **(RGG)** ***Co-owner***

IDEA Consortium LLC, ***Owner***

Chequamegon Institute, Inc. ***Initial Registered Agent***

Coalition for Eco-Industrial Development, **(CEID)** ***Work Group Member***

Northwest Wisconsin Workforce Investment Board, **(WIB)** ***Member***

The encircled fractal triangle represents an integrated cluster of seven ideas – economics, ecology, equity, ethics, experience, education and energy – that may be considered a core for sustainability studies. Bruce is available to present illustrated lectures and facilitate discussions about role of education in Industrial Ecology, Sustainable Development and the Sustainability Revolution.