

Fiscal Year 2012, Tokyo Institute of Technology ASPIRE League Research Grant

Selected Research Projects in FY2012

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	Position	Associate Professor
Co-researchers	HKUST	—
	KAIST	—
	NTU	Wun Jern Ng, Professor and Executive Director Division of Environmental & Water Resources Engineering
	Tsinghua	Xinhui Xing, Professor and Vice Dean Department of Chemical Engineering
Subject of the research project		The development of a yeast biodiesel production system from biomass waste
Summary of the research project		<p>Over the past century, humans have built up a dependence on fossil fuels in order to meet their energy needs and this dependence has been accompanied by the global problems of climate change and energy shortages. Biofuels, such as bioethanol and biodiesel, are attractive alternative energy resources that can potentially address these problems. However, biofuel production technologies using corn, potato, and wheat put pressure on food stocks and are in turn predicted to introduce food shortages if alternative biofuel technologies are not developed. This factor has motivated the development of biofuel production technologies using biomass waste.</p> <p>In this joint research project, researchers from China, Japan, and Singapore will work together to develop biodiesel production technologies and other engineering systems based on yeast and biomass waste. Such collaboration first occurred in an ASPIRE League project in 2011 focusing on waste recycling technologies and biotreatment systems for industrial effluents.</p>

	<p>This three-country team has already carried out early studies on the creation of a library of random yeast mutants using the novel atmospheric and room temperature plasma (ARTP) mutation system, the screening of mutants for their ability to accumulate high quantities of lipids, the chemical conversion of biomass wastes (such as scrap wood and excess sludge) to carbon and nitrogen sources that could be used for yeast cultivation, and the development of efficient technologies for the cultivation of lipid-accumulating yeast as well as biochemical techniques for biodiesel extraction.</p> <p>This grant proposal seeks to further current research and lead to the development of an economical biodiesel production system which can be combined, in terms of functionality, with waste treatment and resource recovery requirements. It is also envisaged that the resulting technology will be able to be applied in small-scale, localized types of energy production systems, rather than as a large-scale system requiring the collection and movement of biomass waste to and from different locations.</p>
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