

September/October 2012

RESOURCE

engineering and technology for a sustainable world



SPECIAL SECTION
Information and
Electrical Technologies
Transforming Ag and Bio Engineering

Also inside: *Visual Challenge 2*

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ON THE COVER

ASABE member Amy Kaleita and Brian Hornbuckle discuss the validation of remotely sensed estimates of the water cycle under a microwave radiometer positioned over a cornfield in Ames, Iowa.

Photo courtesy of Bob Elbert.



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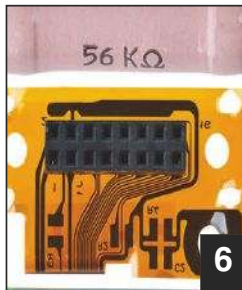


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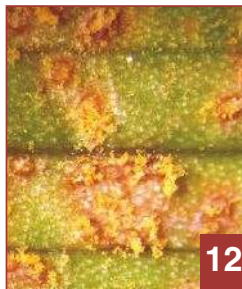
FEATURES



6 Special Section: Information and Electrical Technologies

Brian Steward, guest editor

ASABE members are changing the profession—measuring, monitoring, and characterizing agricultural and biological systems through information and electrical technologies. Before IET, this ability was limited. It's a new day ... read on!



8 Information Technologies for Field-Based High-Throughput Phenotyping

Kelly Thorp, Pedro Andrade-Sanchez, Michael Gore, Jeffrey White, Andrew French

"Field-based, high-throughput phenotyping seeks to implement information technologies to rapidly characterize the growth responses of genetically diverse plant populations in the field and relate these responses to individual genes."



10 CAN Bus Technology Enables Advanced Machinery Management

Matthew Darr

"The accessibility and standardization of CAN Bus technology has opened up tremendous opportunities for machinery performance researchers and will serve as the platform for advances in machinery management and agricultural supply chain logistics. The possibilities are just being explored."

12 Leveraging IT for the Benefit of Cooperative Extension

Jiannong Xin

"In Cooperative Extension, IT has fundamentally transformed the way we communicate, engage clientele, and deliver information." It is value-added technology on the advance.

16 Mechanization and Automation Technologies in Specialty Crop Production

Manoj Karkee and Qin Zhang

What is the current status and potential implications of specialty crop mechanization and automation? And what are the future possibilities?



18 The ADM Institute for the Prevention of Postharvest Loss

Steven T. Sonka

Focused on reducing post-harvest losses of cereals and oilseeds in developing countries, this new institute serves as an international information and technology hub. Research driven, it evaluates, creates, and disseminates economically viable technologies, practices, and systems that reduce post-harvest loss in staple crops.

20 The 10,000 Challenge

Thomas K. Grose

The Obama administration's challenge throws into sharp relief several pressing problems in engineering education.

22 2012 ASABE International Meeting

Highlights from the Society's annual gathering, this year in Dallas, Texas.

24 Visual Challenge 2

Ag and bio engineers speak the language of their profession through photography and illustration in our second call for images.



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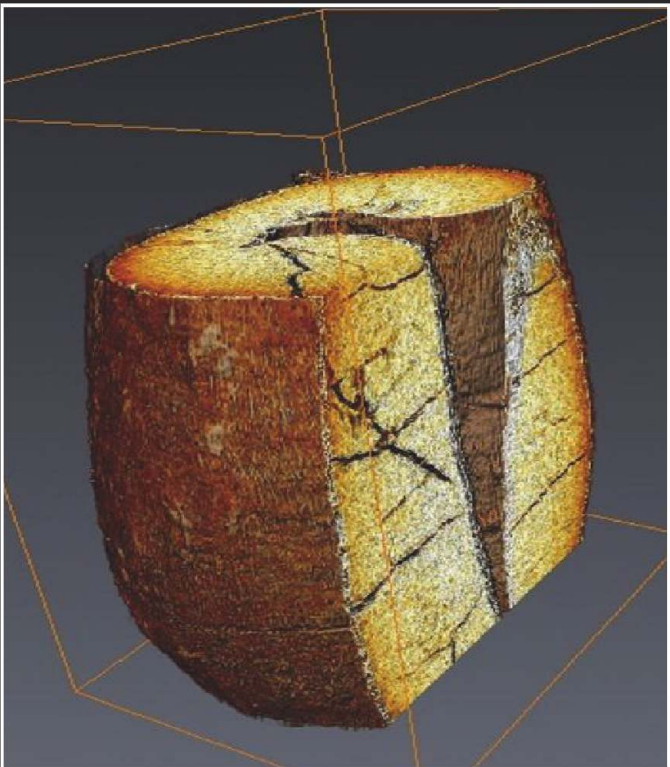
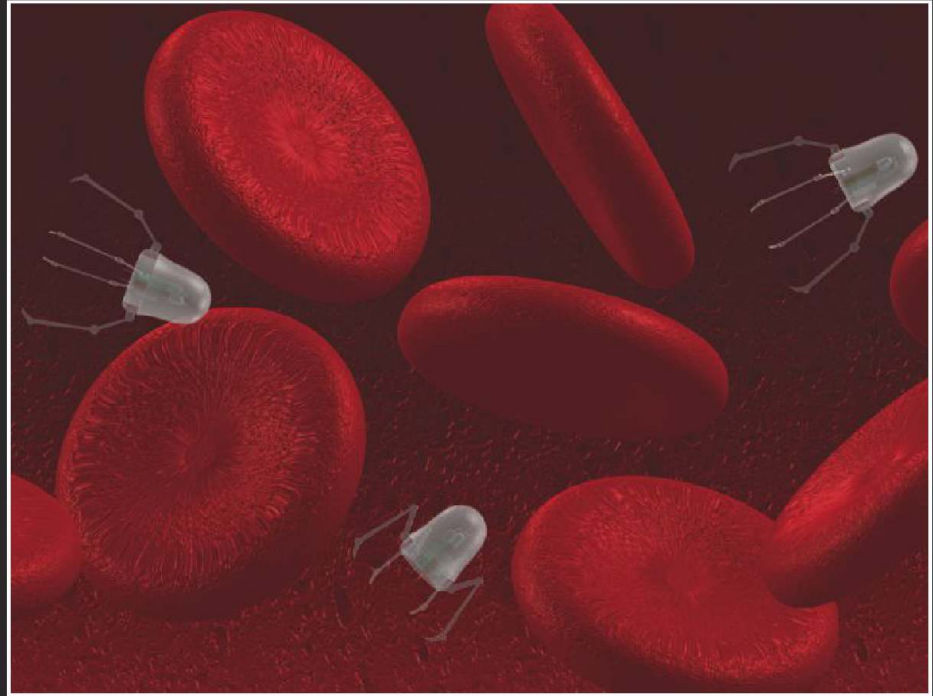
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31 Last Word

Ron Britton

Some thoughts on design ... and on who is responsible for the consequences

ERRATUM In "Energy Security: Let's Get it Right" by Gale A. Buchanan and James R. Fischer (*Resource*, March/April 2012, pp. 14-15), the GDP and energy consumption figures were incorrect. The U.S. GDP is about \$48,000 per capita, with about 300 million BTUs of energy consumed per person. China's GDP is about \$8,000 per capita, with over 64 million BTUs of energy consumed of per person. Our thanks to ASABE Fellow Howard P. Johnson for suggesting these up-to-date corrections. We regret the errors.



Lab Trio: Today's Research, Tomorrow's Reality

Photographers: Matthew DiCicco/Suresh Neethirajan
 Graduate Student/Assistant Professor,
 BioNano Laboratory, University of Guelph, Canada

Top left "Seemingly Spotless Surgical Screw Studied Up-Close"
 Stainless steel screw, used in canine orthopedic surgery, at scale 1.5 millimeters.

Illustrator: Mark Fletcher, Concept: Suresh Neethirajan
 Undergraduate Student/Assistant Professor,
 BioNano Laboratory, University of Guelph, Canada

Top right "Exploring the Great Red Sea"
 Computer-assisted illustration of bionanorobots maneuvering through
 the blood stream in search of tumors.

Tomographers: Anup Suresh/Suresh Neethirajan
 Undergraduate Student/Assistant Professor,
 BioNano Laboratory, University of Guelph, Canada

Immediate left "3D Grain Kernel"
 Real-time three-dimensional visualization of fissures and cracks inside
 insect-infested durum wheat kernel using X-ray micro-computed tomography.

Illustrators:
Stephen L. Young
 Weed Ecologist, University of
 Nebraska-Lincoln, North Platte, USA

Michael Heller
 Graphic Artist, University of
 Nebraska-Lincoln, North Platte, USA

"The Future of Weed Control"

*Robotic weed control will be an essential
 element of tomorrow's more targeted, integrated
 weed management in cropping systems.*

*Researchers at UNL's West Central Research and
 Extension Center are looking at what these systems
 would need and how they could integrate the latest
 technologies in weed identification, biology,
 engineering, and control into a single platform.*

