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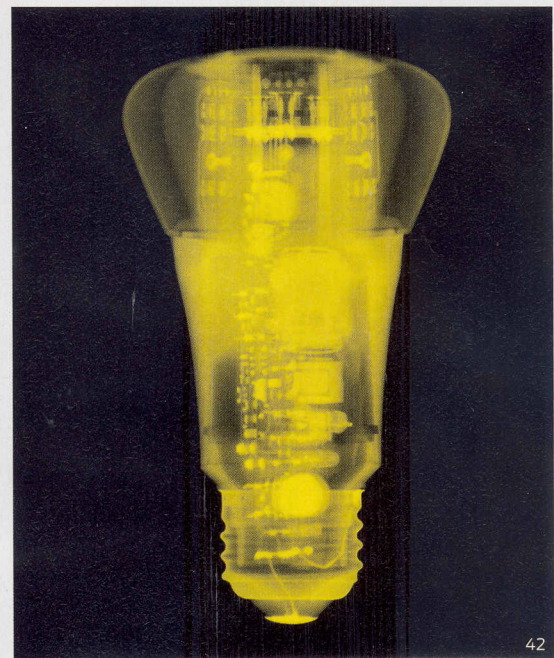
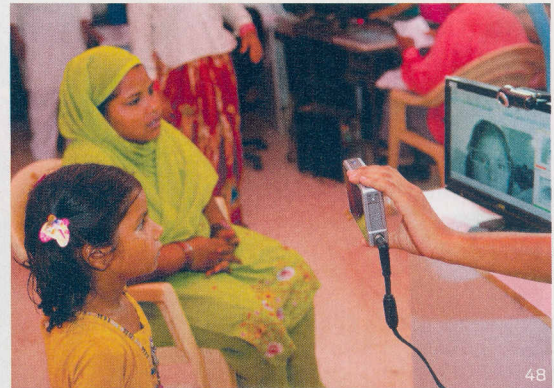
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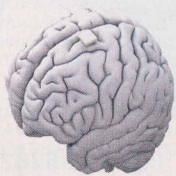
Becoming **BIONIC**

*A radical strategy for turning
thought into action could help the disabled
and maybe even lead to cyborgs*



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New findings in brain-machine interfaces may allow people to control robotic

prostheses as if they were a natural part of the body.

By Jose M. Carmena

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The defibrillators posted in public places absolutely, positively have to work when you need them—but all too often they don't. *By Mark Harris*

36 VOYAGE TO THE BOTTOM OF THE SEA

Virgin Oceanic's adventurers are aiming their radical, experimental sub straight for the bottom of the Mariana Trench. *By Eliza Strickland*

42 DRIVING THE 21ST CENTURY'S LIGHTS

It's clear that high-brightness LEDs make for great lighting, but their drive circuitry poses some practical challenges. *By Bernie Weir*

48 INDIA'S BIG BET ON IDENTITY

India's ID program is already the world's largest biometric system, and it still has a billion more people to go. *By Joshua J. Romero*

COVER: BRYAN CHRISTIE DESIGN; THIS PAGE: CLOCKWISE FROM LEFT: VIRGIN OCEANIC; JOSHUA J. ROMERO; DAVID ARKY



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The outcome of a wind turbine tech fight could show whether China has finally begun to respect intellectual property. *By Eliza Strickland*

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Koreans have spun a high-tech success story that has some surprising lessons for Americans. *By G. Pascal Zachary*

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Obsolete engineering skills: Using a slide rule, drafting, and...mathematics? *By Robert W. Lucky*

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The evolution of the lightbulb is best seen in X-ray light.

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A tiny fuel-sipping plane will circumnavigate the globe.

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A year later, has Fukushima shut down nuclear engineering as a career? *By Prachi Patel*

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Our beloved technogadgets come from hundreds of brands but only a handful of manufacturers. *By Mark Anderson*

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AVAILABLE 1 MARCH

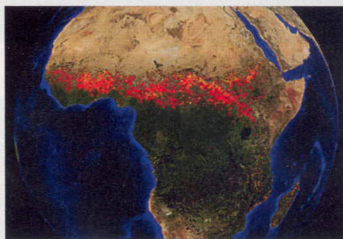
Trench Trailblazers

In 1960, two brave aquanauts made the first manned descent to the bottom of the Mariana Trench in an eccentric deep-sea vehicle called a bathyscaphe. To date, no one has repeated their journey. Listen to pilot Don Walsh [front] reminisce about his historic dive at <http://spectrum.ieee.org/bathyscaphe0312>.



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NEW TOOL TO HELP MONITOR THE ENVIRONMENT

Too much data coming from too many sources can be downright confusing. Such is the case with the numerous programs watching events that affect the environment. Luckily, the Global Earth Observation System of Systems is being developed to overcome this challenge.

IEEE MEDAL OF HONOR GOES TO HENNESSY

Fellow John L. Hennessy, president of Stanford University, is the recipient of the 2012 IEEE Medal of Honor "for pioneering the RISC processor architecture and for leadership in computer engineering and higher education."

HATICE ALTUG: DIAGNOSING DISEASE FASTER

When it comes to fighting off disease, early detection is key. But the technology for diagnosing some diseases can be expensive and unwieldy, and the process can be time-consuming. That's where IEEE Member Hatice Altug's portable biosensor comes in.

ONLINE WEBINARS & RESOURCES

AVAILABLE AT <http://spectrum.ieee.org/webinar>

14 March: Common Platform Virtual Technology Forum 2012

15 March: Piezoelectric Device Simulations

20 March: Electromagnetic Simulation of Antennas Installed Inside Vehicles— an Automotive EMC Approach

22 March: A New System-Level Design Methodology for FPGA-Based Smart Grid Power Electronics

22 March: CST Studio Suite 2012 Update Webinar on Low Frequency Simulation

29 March: Designing Energy Efficient, Connected, and Secure Smart Energy Solutions

Joule Heating Simulations

Modeling Multipacting Phenomena With the VORPAL Code

Calibre PERC: Effective Reliability & Low Power Verification

Fluid Structure Interaction Simulation With COMSOL

Planning, Architecting, and Executing Smart Grid Transformations

Atmospheric Pressure Discharges via Hybrid Simulations in VORPAL

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