

OPN

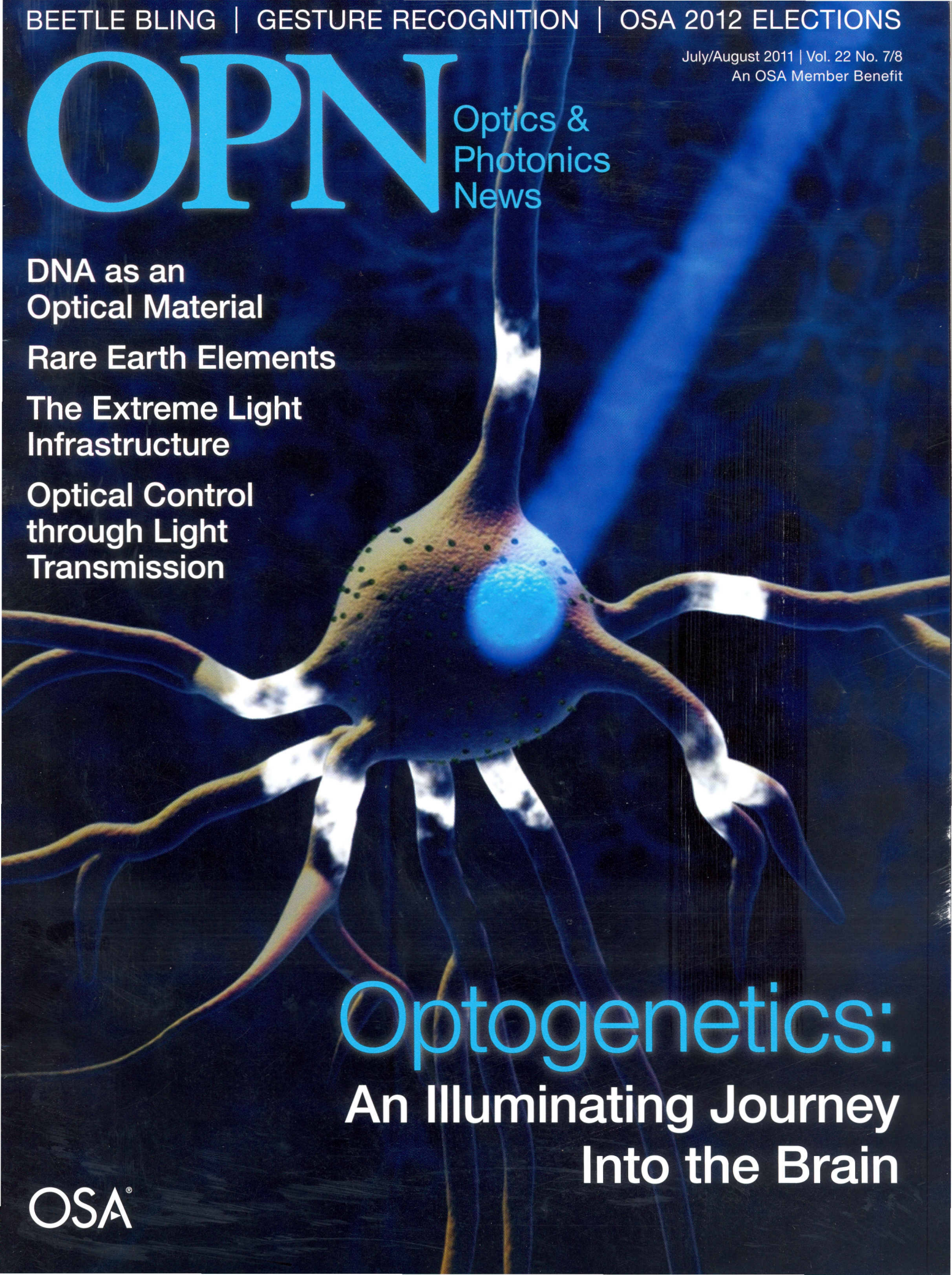
Optics &
Photonics
News

DNA as an
Optical Material

Rare Earth Elements

The Extreme Light
Infrastructure

Optical Control
through Light
Transmission



Optogenetics:
An Illuminating Journey
Into the Brain

Using tools from optics, virology and genetics, researchers are literally shining light into the brains of mammals. Their work may inspire targeted new treatments for neurological diseases.

[COVER STORY]

26 Optogenetics: An Illuminating Journey into the Brain

Through the fascinating new study of optogenetics, researchers can use light to control brain cells that have been genetically engineered to respond to specific wavelengths. This rapidly evolving field is helping to demystify how neural circuits function.

Sally Cole Johnson

34 DNA as an Optical Material

DNA, the beautifully symmetrical “molecule of life,” carries the core genetic blueprint for every living organism. Now, through the emerging field of DNA photonics, it also has the potential to serve as an inexpensive, renewable resource in the development of optical waveguides, organic LEDs and laser structures.

A.J. Steckl, H. Spaeth, H. You, E. Gomez and J. Grote

40 Rare Earth Elements: High Demand, Uncertain Supply

Rare earth elements are garnering global media attention because of their role in clean energy technologies. But these elements—which have also enabled spectacular innovations in optics over the past decades—are now subject to unprecedented price shocks due to uncertainty around future supply. What does this mean for the optics community?

Marcus Extavour

47 The Extreme Light Infrastructure: Optics' Next Horizon

The Extreme Light Infrastructure—a project involving nearly 40 research and academic institutions from 13 EU member countries—will allow researchers to probe laser-matter interaction at unprecedented intensity levels.

G rard Mourou and Toshiki Tajima

52 Optical Control through Light Transmission

The simple action of passing laser light through an optically transparent system may enable researchers to control a number of mechanical and optoelectronic processes. These novel interactions of light present an array of useful applications in optical switching, optical binding and fluorescence imaging.

David S. Bradshaw and David L. Andrews

COVER: A neuron with nanometer-sized proteins (tiny dots) on it flashes when blue light hits it. Courtesy of Ed Boyden's lab.

This page: Mouse movement control demonstration. Courtesy of Karl Deisseroth's lab.





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Boosting precision and stability of optical lattice clocks; metallic beetles bring bling; ship-borne laser zaps target a mile away; better nanoparticle detection sensitivity with optical microcavities.

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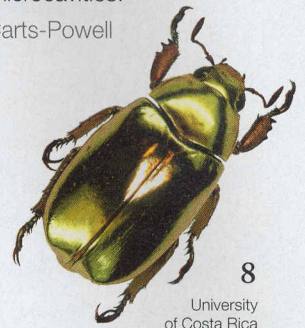
John N. Howard

60 OSA Elections

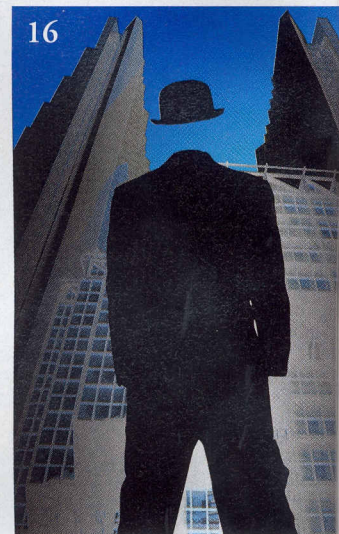
2012 election preview.

68 In Memory


Remembering Nobel Prize winner Willard S. Boyle and OSA Fellow Giuliano Toraldo di Francia.



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University of Costa Rica



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