

# ***AMERICAN SCIENTIST***

## CONTENIDO

VOLUME 99, No. 1, JANUARY-FEBRUARY 2011

### **DEPARTMENTS**

- 2 **From the Editor.**
- 3 **Letters to the Editors**
- 6 **Macroscope**  
Spectator at the disaster.  
*John Dvorak.*
- 10 **Computing Science**  
Flights of fancy.  
*Brian Hayes.*
- 16 **Engineering**  
Bridges of the Mediterranean.  
*Henry Petroski.*
- 20 **Marginalia**  
The biology of what is not there.  
*Robert L. Dorit.*
- 24 **Ethics**  
A troubled tradition.  
*David B. Resnik.*
- 28 **Science Observer**  
Cracking cellular motion • Get a grainy grip • Unauthorized reproduction is not prohibited  
• In the news.
- 68 **Sightings**  
Mapping macromolecules in cells.

### **SCIENTISTS' BOOKSHELF**

- 70 **Book Reviews**  
Childhood • Hunder-gatherers • Cyberneticians • Hotter cities

### **FROM SIGMA XI**

- 90 **Distinguished Lectureships, 2011-2012**

- 93 **Sigma Xi Today**  
Sullivan selected president-elect • 125<sup>th</sup> anniversary

## FEATURE ARTICLES

- 32 **Fractures and Bindings of Consciousness**  
Seizures suggest how consciousness is bound in large-scale cerebral networks.  
*Don M. Tucker and Mark D. Holmes.*
- 40 **From Treasury Vault to the Manhattan Project**  
It took 14,000 tons of government silver to build the world's first atomic bomb.  
*Cameron Reed.*
- 48 **Chromatin Evolving**  
Much about the function and evolution of the chromosome remains a mystery.  
*Gregory A. Babbitt.*
- 56 **American Scientist Classics: Galaxies**  
An astronomer and a science historian revisits Harlow Shalow Shapley's 1942 article.  
*Virginia Trimble.*

## THE COVER

*DNA is an exotic polymer that measures on the atomic scale in one dimension (width) and the human scale in the other (length). Every human cell contains about two meters of DNA, almost all wound around proteins called histones to form nucleosomes. Nucleosomes group together to form higher levels of structure about which, after a hundred years of investigation, we still know very little. We do know that the DNA packs tightly in some chromosomal territories and loosely in others, forming sheer walls and intergenic fissures, as seen in the cover image from a 3D animation by renowned molecular animator Drew Berry. (The image at left includes structural proteins of the nuclear envelope not shown on the cover.) In "Chromatin Evolving" (pages 48-55), evolutionary biologist Gregory Babbitt reviews what we know and don't know about the higher-level structures formed by DNA, including how they are investigated, how they affect gene regulation and how they evolve.*