

Science in the headlines

—by Ilse Genovese

Scientific disciplines are much like living organisms: instead of evolving slowly but continuously, they enjoy long stretches of stability punctuated by occasional revolutions caused by the appearance of a new theory, a new paradigm, or a new technology. The “big bang” analogy is particularly apt in the study of the causes and consequences of biological upheavals on Earth, with valuable clues emanating from space astrophysics and, yes, space geodesy.

On the following pages we attempt to show the link between life on Earth with events in space discovered with telescopes, satellites, and computers by retracing some of the recent and not so recent “revolutions.” We begin with a computer-like device 2,100 years old and contrast this with the supercomputers now facilitating discovery here on Earth and millions of cosmic years away. NOAA’s newest super climate and weather modellers are examples of our profession’s contribution to visualizing Earth phenomena. Then, back we go to outer space. We touch on the mysteries of black holes and take a close look at solar birth with the ageing Hubble and its successor, the Web telescope. We experience the January 14th Mercury flyby and the 50th anniversary of Explorer 1 on January 31, and greet ecstatically both with “Here’s looking at you, Universe.” And then we return to Earth—with sensors on drones that may take us into the very eye of a category five hurricane. To make the leap from space to Earth, we use space geodesy—a field of scientific and technological endeavor that is transforming surveying on Earth and beyond.

About the background image: This Hubble Space Telescope composite image shows a ghostly “ring” of dark matter in the galaxy cluster Cl 0024+17. The ring-like structure is evident in the blue map of the cluster’s dark matter distribution. The map is superimposed on a Hubble image of the cluster. Credit: NASA, ESA, M.J. Jee and H. Ford (Johns Hopkins University).