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SCIENCE

Nine Scientists Win Kavli Prizes Totaling $3 Million

By NICHOLAS ST. FLEUR JUNE 2, 2016

Nine scientists have won this year's Kavli Prizes for work that detected the echoes of colliding black holes, revealed how adaptable the nervous system is, and created a technique for sculpting structures on the nanoscale.

The announcement was made on Thursday by the Norwegian Academy of Science Letters in Oslo, and was live-streamed to a watching party in New York as a part of the World Science Festival. The three prizes, each worth $1 million and split among the recipients, are awarded in astrophysics, nanoscience and neuroscience every two years. They are named for Fred Kavli, a Norwegian-American inventor, businessman and philanthropist who started the awards in 2008 and died in 2013.

The astrophysics prize went to Rainer Weiss from Massachusetts Institute of Technology, Ronald W.P. Drever from the California Institute of Technology and Kip S. Thorne, also from Caltech, for directly detecting gravitational waves. While using the Laser Interferometer Gravitational-Wave Observatory (LIGO) in September of last year, they observed wiggles in space-time that were first theorized by Albert Einstein in 1916, opening a new window on the universe.

"The real credit for this goes to the whole LIGO team," said Dr. Thorne, who attended the viewing party in New York with Dr. Weiss. "I wouldn't be here without the people who started it, and it would not have succeeded without this team of a thousand people who made it happen."

The winners of the nanoscience prize are Gerd Binnig, formerly a member of the IBM Zurich Research Laboratory in Switzerland; Christoph Gerber from the University of Basel in Switzerland; and Calvin Quate from Stanford. They

were awarded for inventing atomic force microscopy and developing practical uses for it.

Unlike many other forms of microscopy, atomic force microscopy acquires images of samples on the nanoscale by “feeling” them rather than “seeing” them. Atomic force microscopes use sharp tips attached to flexible arms called cantilevers to scan a material’s surface, like a stylus on a record player. A laser beam helps the device detect bends in the cantilever, allowing it to take images of the material’s topography on the nanoscale. The technique has been widely used in biology, chemistry, physics and materials sciences to visualize viruses, bacteria and chemical bonds. The tip can also add, remove and arrange atoms on a surface.

Eve Marder of Brandeis University, Michael M. Merzenich of the University of California, San Francisco, and Carla J. Shatz of Stanford won the neuroscience prize. Dr. Marder illuminated the flexibility and stability of the nervous system through her work studying crabs and lobsters and the neurons that control their digestion. Dr. Merzenich was a pioneer in the study of neural plasticity, demonstrating that parts of the adult brain, like those of children, can be reorganized by experience. Dr. Shatz showed that “neurons that fire together wire together,” by investigating how patterns of activity sculpt the synapses in the developing brain.

The winners will receive their prizes in September at a ceremony in Oslo.