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Computers Are Driving The Future of Scientific Research

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Computers have become ubiquitous tools that are revolutionizing modern society and our daily lives. Computers have spawned multimillion dollar tech industries, e-commerce giants and small local business. [Computers](#) have also played a major role in transforming science and scientific research.

Science today is beholden to internet and computer technologies, which are an integral aspect of all parts of science, from research to engineering and business enterprise.

The importance of the computer to scientific research is about to be put to the test, and in more ways than many people may realize. After a two year hiatus, the European Organization for Nuclear Research, or Cern, has [announced the reopening](#) of their massive particle accelerator the LHC, or Large Hadron collider. The hadron collider launches subatomic particles at close to the speed of light around specialized tunnels which span almost 17 miles around. Particles run in both direction picking up speed before they smash into one another with such force that they create and capture, if only for a brief fraction of a millisecond, particles which before only resided in the imagination and math of renowned physicists.

All this quantum smashing would be impossible without computers. Computers run by super

advanced [industrial PC boards](#) are essential for scientists to continue unlocking the secrets and mysteries of the universe. It is computers which help time the particle launch, calculate the speeds required to produce the particle smashing, control advanced highly sensitive sensors and help analyze the unfathomable amounts of data produced by the particle collisions. It is computers that make it possible to smash two particles, so small they can not even be seen by the human eye or even the most power microscopes, together.

With the help of high powered computers, the LHC is seeing a massive rise in data collection and production. The detectors and sensors used for this scientific research are producing over one petabyte of data every second! Despite this astronomical number of data, physicists believe the new computing power of the Hadron Collider will be capable of producing, sensing, and recording even more data in the up coming runs.

As computers prove their power with the LHC, scientists in all fields are beginning to investigate the current IT infrastructure and its current capacity as it relates to data acquisition, networks, communication, and data analysis. The ISGTW, or the [International Science Grid This Week](#), writes, "The life sciences and other research fields are also seeing similar rates of data explosion, says James Hughes of Huawei. "We are really standing at a crossroads when it comes to storage," he concludes.

In the same article Cern project manager Bill Jones remarks, "'It's not only testing, though...By doing this we're helping the companies to improve their products and services.'" Jones continues to say that, "CERN essentially acts as an example use case for this state-of-the-art technology: By using CERN openlab as a showcase, companies can then promote their products and their services to other labs and different business sectors."

Even the lab itself is being run by massive computers. Facility management has become big business. These large scale scientific facilities use computers to help the daily operation of their massive labs and infrastructures. Computers are helping automate every aspect of a modern lab or scientific facility. Computers turn on and off the lights, control environmental factors, control and manage, temperature and air circulation, janitorial services, mail rooms, security, all to ensure the highest efficiency from the facility as possible. The actual facility itself is relying on computers to help support integral facility systems.

The world's research institutions are projected to produce unimaginable amounts of data in numerous scientific branches such as, neurology, radio astronomy and genetics. Advanced instrumentation such as Earth observation satellites, high-performance genomic sequencers, neutron diffractometers and X-ray antennas are all being operated by industrial computers and computer software. The computer revolution just may be one of the leading factors driving our humanities scientific advancements.

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