# What is a Computer and Information Research Scientist?

A computer and information research scientist is an expert in the field of computer science, usually holding a PhD or professional degree. These scientists use the collective knowledge of the field of computer science to solve existing problems and devise solutions to complex situations. They work to expand the amount of knowledge available to computer science and to make computer technology more efficient, sometimes making leaps in software technology that are as important as advances in computer hardware capabilities.

These professional researchers are the ones responsible for finding vulnerabilities in software before malicious hackers have a chance to cause damage. For example, the [Compression Ratio Info-Leak Made Easy](https://www.isecpartners.com/blog/2012/september/details-on-the-crime-attack.aspx), or CRIME exploit, was discovered by computer and information research scientists Thai Duong and Juliano Rizzo, leading to the abandonment of TLS compression in modern Web browsers. Without these professionals working on advanced problems, modern technology would be much less advanced and robust.

# What Do Computer and Information Research Scientists Do?

Computer and information research scientists don’t spend a much time designing applications or typing code. They spend many years studying discrete mathematics, computation theory, formal languages, algorithms and data structures so that they can find clever solutions to the most difficult problems facing computer science. Rather than a laptop or desktop computer, these researchers work with pen and paper most of the time, balancing equations and looking for more efficient solutions to existing problems.

One of the biggest problems known to computer science is question of [P versus NP](http://www.claymath.org/millenium-problems/p-vs-np-problem). In this problem, P stands for polynomial time complexity and NP stands for nondeterministic polynomial time complexity. The question computer scientists want to answer is whether the two sets of problems are in fact the same set, two overlapping sets or two completely separate sets. If they were found to be the same set of problems, mathematics and computer science would be transformed, and many extremely difficult problems would become much easier to solve.

# How to Be a Computer and Information Research Scientist

The first step to beginning this career is to earn a[bachelor of science in computer science](http://www.computersciencedegreehub.com/best/online-bachelors-programs/), choosing the degree track that transitions into graduate school. A master’s degree isn’t necessary, and in some cases, it can hurt your chances of earning a PhD because many graduate schools consider a master’s degree to be a terminal degree. A PhD usually takes six to eight years to complete, although it can go faster with grants and excellent academic work. According to the U.S. Bureau of Labor Statistics, the federal government may hire computer and information research scientists with just a bachelor’s degree, although the salary is much less.

With a PhD in computer science or a related field, researchers earn a median annual salary of around $102,000, with the highest-paid 10 percent making at least $151,000. The job outlook for computer and information research scientists is better than average, with job growth expected to be around 15 percent for the next ten years. Because the education requirements are so high, many companies say they have trouble filling these positions.

Using your mind to solve the biggest problems in computer science requires a true passion for science and mathematics, not to mention the personal sacrifice of earning a PhD. If you think you have the calling to become an expert in an advanced field, continue learning how to become a computer and information research scientist.