

**YOUR GUIDE TO
LAUNCHING
YOUR COMPUTER
SCIENCE CAREER**

Northeastern
University





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The computer science field is multifaceted, with database, software, and analytics roles available across multiple industries. Whether you pursue a career as a software developer for an online learning company or design data communication networks for multinational organizations, there are hundreds of thousands of options—and counting—to explore.

Industry Outlook



“The computer science field is growing at a crazy pace,” says **Ian Gorton**, director of computer science programs at Northeastern University–Seattle. “Computing is being infused into all elements of society, and the demand is insatiable. Technology is changing and evolving so quickly that there are many opportunities available for these workers.”

The U.S. Bureau of Labor Statistics (BLS) anticipates employment in the computer science field to **grow by 12 percent** between 2018 and 2028, much faster than average compared to other occupations. At that pace, the BLS estimates that **546,200 new jobs** will be available within the same time period, and companies will need qualified individuals to fill those jobs.

As competition to attract high-talent applicants increases, those seeking a career in computer science will have a wealth of opportunities available to them. Because **most companies prefer** hiring employees with a master's degree or higher in computer science or a related field, continuing or beginning your education in computer science is essential.

“Computing is being infused into all elements of society, and the demand is insatiable.”

– Ian Gorton, director of computer science programs at Northeastern University–Seattle

What is Computer Science?



Computer science is a wide-ranging field that allows you to embark on a range of careers related to computers, computation systems, and the software that enables them. When you undertake a **master's degree in computer science**, you'll study the theory, design, development, and application of these elements, with the opportunity to dive deeper into a specialization, like artificial intelligence or game design.

In practice, computer science is about **more than just coding**, though strong programming skills will be important in any job within this field. Regardless of your role, you'll also work to analyze problems and develop efficient solutions, evaluate project plans for feasibility, and consult with users, managers, vendors, and technicians to ensure your work meets their needs. If you enjoy problem solving, being creative, and technology, computer science can be a rewarding field in which to develop your career.

Building Blocks of Computer Science

THEORY

DESIGN

DEVELOPMENT

APPLICATION

Source:
Northeastern University

Career Paths in Computer Science



Computer science professionals are needed across multiple industries and at all levels of seniority. Developing the skills necessary to fill these roles can help you establish yourself in a career that is both secure and varied, with opportunities to make a real impact on the way organizations around the world function.

A computer science professional can expect an **average salary of \$118,370**, according to the BLS. This number can vary based on your specific industry, years of experience, level of education, and any special or in-demand skills.

Here are some of the top computer science roles in which you can launch or expand your career.

Software Developer

Total Job Postings: 1,365,500
Median Pay: \$105,590
Projected 10-Year Growth: 21%
(BLS, 2018)

As a software developer, you'll design, test, and create applications for a wide range of purposes, from data management programs to computer operating systems. Software developers ensure that the programs they create function properly after launch, recommend upgrades, and collaborate with other specialists to develop robust software programs. A degree or concentration in **software engineering** can help you secure one of these roles.

Network and Computer Systems Administrators

Total Job Postings: 383,900
Median Pay: \$83,510
Projected 10-Year Growth: 5%
(BLS, 2018)

These professionals are responsible for the day-to-day network management operations that keep organizations running. Their duties include setting up networks and computer systems, installing network hardware, collecting data to optimize system performance, and assigning security permissions. If you're interested in one of these roles, consider a degree or concentration in networks.

Web Developer

Total Job Postings: 160,500
Median Pay: \$73,760
Projected 10-Year Growth: 13%
(BLS, 2018)

Those interested in studying a variety of programming languages can turn their interest into a career as a web developer. In this role, you'll design, create, and optimize websites for maximum performance and capacity. Web developers write code, monitor web traffic, and work either in teams or as independent contractors with their own businesses.

Learn More | [How to Improve Your Coding Skills](#) →

Game Designer

Total Job Postings: 71,600

Median Pay: \$72,520

Projected 10-Year Growth: 4%
(BLS, 2018)

Computer science is about more than coding. As a game designer, you'll have the opportunity to build games based on both playability and analytics. By combining design and technological skills, you'll have the tools necessary to create enjoyable, technically sound games for a variety of platforms.

Learn More | [Tips for Building a Career in Video Game Design](#) →

\$118,370

average salary a computer science professional can expect

(BLS, 2018)

Data Scientist

Total Job Postings: 116,900

Median Pay: \$95,000 for entry-level roles

Projected 10-Year Growth: 9%
(Burtch Works, 2018)

Data scientists blend computer science and analytics skills to collect, analyze, and interpret large and complex data sets. Using predictive analytics and machine learning, they develop algorithms and find patterns in data that can help further research in a wide range of fields. Data science has become increasingly popular in recent years, with growth expected to continue increasing.

Penetration Tester

Total Job Postings: 112,300

Median Pay: \$98,350

Projected 10-Year Growth: 32%

(BLS, 2018)

If you enjoy finding weak spots in systems and helping to fix them, a job as a penetration tester may be for you. This role allows you to test out real-world tactics a hacker may use to gain access to a computer system, then document any issues you spot and collaborate with organizations to patch them up. Consider a degree or concentration in information security if you're interested in roles like these.

[Learn More | How to Become an Ethical Hacker →](#)

Computer Systems Analysts

Total Job Postings: 633,900

Median Pay: \$88,740

Projected 10-Year Growth: 9%

(BLS, 2018)

Systems analysts study an organization's existing systems and procedures, then design solutions that achieve the company's goals more efficiently and effectively. They consider the needs and limitations of the business in relation to the technology available, often developing customized solutions to meet specific requirements for each client. Studying computer systems at the master's degree level will be useful in this career path.

Trends in Computer Science



Technology is continually evolving, and computer science professionals are at the forefront of enabling these changes. By entering or advancing your career in computer science, you may be perfectly positioned to contribute to these trends. You can also use your familiarity with them to obtain a competitive advantage over other job applicants in your chosen specialty.

Artificial Intelligence

Artificial intelligence powers everything from virtual assistants like Amazon's Alexa to algorithms **advancing medical research**. Though the field has exploded in recent years, the widespread use of AI is still developing as professionals gain a greater understanding of how computers can be trained to think like humans. Careers in AI include data analysis, user experience, natural language processing, research, and software engineering.

Learn More |
[5 Top Careers in Artificial Intelligence](#) →

Internet of Things

There are **billions of internet-connected devices**, like smart thermostats and doorbell cameras, and experts predict a rapid increase in internet-enabled devices for both personal and industrial usage over the next few years. As more devices become part of the Internet of Things, jobs in this specialization—primarily those related to software development—will continue to grow.

Learn More |
[How to Become an IoT Developer](#) →

Robotic Process Automation

The robots in **robotic process automation** (RPA) aren't walking around in the physical world or picking warehouse orders. They're embedded in software that helps automate repetitive processes, freeing up valuable time for employees to do other tasks. RPA software completes tasks quickly and accurately, and there's a growing need for software developers who can create both general and highly customized products for their clients.

Learn More |
[The Next Big Breakthrough in Robotics](#) →

Essential Computer Science Skills



To succeed in the computer science industry, you'll need solid technical skills, like coding and data visualization, alongside soft skills, such as critical thinking. Here's a sampling of the **skills you should develop** to succeed in a computer science role.

Technical Skills

- > Programming
- > Math
- > User Protections
- > Data Analysis and Visualization

Soft Skills

- > Critical Thinking and Creative Problem Solving
- > Attention to Detail
- > Communication
- > Collaboration

TECHNICAL SKILLS

1

Programming

Coding is the foundation of computer science, and it pays to be proficient in several languages. “Once you’re proficient in those, it’s easy to learn the others that you might need in order to move around the industry,” Gorton says. Some of these languages include Java, Python, C, and C++, and are the building blocks for a number of other desirable skills. Employers, for example, seek professionals who know how to design and maintain application software, support network infrastructure, and understand algorithms as well as theoretical computer science principles.

3

User Protections

As technology continues to advance into areas like artificial intelligence, computer science professionals must ensure that their work helps maintain users’ privacy, security, and best interests.

2

Math

Solid knowledge of statistics, calculus, linear algebra, and other advanced mathematical techniques will help you succeed in this field. Mathematical theory is also important, as it can help you think critically when faced with unfamiliar challenges.

4

Data Analysis and Visualization

Basic data analysis skills are crucial, particularly for those seeking careers in artificial intelligence and predictive analysis. The ability to present, or visualize, that data clearly and accurately helps you **present your findings** to stakeholders.

SOFT SKILLS

1

Critical Thinking and Creative Problem Solving

Being able to identify, analyze, and resolve a problem with an effective—and sometimes outside-the-box—solution is an important part of any job in computer science.

2

Attention to Detail

A small mistake in a line of code can crash an entire system, so it's important to pay attention to the many details and complexities of this work.

3

Communication

Good communication skills will allow you to provide your managers, teams, and stakeholders with valuable information as you work. Listening skills are equally important. Developing these ensures that all parties involved always have the information they need to make intelligent decisions.

4

Collaboration

Computer science is a collaborative field, and most within it operate as members of extensive teams. Whether you need to hold product development meetings or work with a team on creating customized solutions, the ability to work as part of a group will set you apart.

The Benefits of an Advanced Degree



Choosing to go back to school for your master's degree is a large commitment of your time and finances, but for those seeking to advance or enter careers in computer science, **the investment is worth it.**

Increased Marketability

Computer science professionals with advanced degrees will find that they qualify for more job opportunities. In 2017, **38 percent of employers** surveyed by CareerBuilder said they had raised their educational requirements when hiring for new jobs, with 61 percent citing the evolving skill set needed for these jobs as the reason for the stricter standards.

Increased Earning Potential

Becoming a more competitive applicant also has the benefit of commanding a higher salary. As your knowledge expands and your resumé becomes more impressive, employers seeking to fill more specialized and higher paying jobs are more likely to notice you. In fact, computer science professionals with a master's degree can see an average **\$30,000 salary increase** after earning their degree.

\$30,000

average salary
increase after earning
a computer science
master's degree

(Georgetown Center on Education
and the Workforce, 2015)

Real-World Experience—Before Graduation

The best way to show off your computer programming, problem solving, and creative abilities is through a portfolio of work. But how do you get real-world experience before you leave the classroom? Internships can be helpful, but students who have more extensive experience will stand out above the rest.

In addition to providing students with a proven way to practice and develop their computer science skills, these opportunities also give them the chance to make a real difference in a business's operations—a valuable resumé booster when it's time to apply for jobs.

Northeastern students participate in **four- to eight-month co-ops** that place them in paid full-time jobs across a wide range of industries, allowing them to become part of a real business team and solve day-to-day problems for their organizations. Students also participate in **Experiential Network** projects, which use real-world data from the university's worldwide partners, as part of classroom studies to reinforce their learning.

Students in Northeastern's MS in Computer Science program have completed co-ops at:

- > Amazon
- > The Broad Institute
- > Facebook
- > Fidelity Investments
- > Google
- > Intuit
- > PayPal



Taking the Next Step in Your Computer Science Career



Northeastern offers two distinct master’s programs for computer science students: a traditional program designed for experienced professionals and people who have an undergraduate degree in computing, and the Align program, which gives students with nontechnical backgrounds the skills they need to successfully complete their degree.

Master of Science in Computer Science

The **Master of Science in Computer Science** is designed for experienced professionals seeking to enhance their knowledge and expand their technology leadership responsibilities in organizations that design, develop, market, or use computing systems. The program lasts 2–2.5 years and can be taken on a full-time or part-time basis.

With 11 areas of specialization, including artificial intelligence, data science, software engineering, and game design, this program allows students to expand their existing knowledge while exploring their own professional interests. The program also includes the ability to complete a co-op throughout the world with one of more than 500 co-op partners.

Available Concentrations:

- > Artificial Intelligence
- > Data Science
- > Game Design
- > Graphics
- > Human-Computer Interaction
- > Networks
- > Programming Languages
- > Security
- > Software Engineering
- > Systems
- > Theory

Co-op Partners in Northeastern's MS in Computer Science Program:



Align Program

Between 2005 and 2015, the number of noncomputer science majors enrolled in introductory classes increased by 152 percent, according to **the CRA**, demonstrating strong interest from professionals outside the industry.

“Computer science is about seriously, deeply, and logistically solving complex problems,” Gorton says. “These fundamentals are applicable to quite a diverse group of people.”

Northeastern’s **Align Master’s in Computer Science** is designed to give you the skills that will enable you to earn an advanced computer science degree—**even if you don’t have a technical background**. The curriculum offers a direct path to a master of science degree for individuals who have no prior programming experience and is a popular option for professionals seeking to change careers or gain a deeper understanding of computer science to support their current work. Students come from a variety of backgrounds, from journalism to biology, business to English.

Chemists, for example, might pursue a degree in computer science to integrate their scientific work with technology,

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2005 and 2015
(CRA, 2017)

“Computer science is about seriously, deeply, and logistically solving complex problems. These fundamentals are applicable to quite a diverse group of people.”

– Ian Gorton, director of computer science programs at Northeastern University–Seattle

including the ability to program software that streamlines their workflows, says Gorton. Educators may use computer science skills to build an intelligent reading system for students, and marketers might use computer science fundamentals to study data patterns that show how people behave online to improve the effectiveness of advertising. Journalists might also seek a degree in computer science to design and build algorithms and data visualizations that support their research.

“We’ve had a variety of nontechnical professionals come through our program,” Gorton says. “The possibilities are endless.”

Students in the Align program spend their first year gaining core competencies and skills considered foundational for a master’s in computer science. They then continue with intensive graduate-level training, taking part in specialized electives, co-ops, and research opportunities.

An Insider's Perspective

Is a computer science degree right for me? Here's why some recent Northeastern alumni chose to pursue a master's degree and how it benefited them.

Computer science programs for undergraduates with liberal arts backgrounds traditionally have a high barrier to entry. When I found out about the Align program, I knew it was exactly what I had been looking for. Khoury College believes that people like me can accomplish great things in computer science, regardless of their technical backgrounds and previous experiences.

Nate Haddad, '20, MS in Computer Science Align

I didn't have the prior experience in computer science that you would normally need for a master's program, so I thought the Align program would be perfect to transition from a business background into a computer science master's program. In addition, the co-op part of the program gave me the experience I needed to determine what areas of computer science I wanted to work in after graduation.

Kaleigh O'Hara, '17, MS in Computer Science Align

We all came from varied backgrounds, and, though a few of us started in STEM fields, many of us did not. We each came hoping that studying computer science would help us shape a better future for ourselves and allow us to contribute in unique ways to our communities.

Darshana Jaint, '20, MS in Computer Science Align

Computer Science at Northeastern: Fast Facts

Northeastern's MS in Computer Science

Master of Science

Program Locations:

- [Boston](#)
- [Seattle](#)
- [Silicon Valley](#)
- [San Francisco](#)
- [Vancouver](#)
- [Toronto \(Fall 2021\)](#)
- [Portland, Maine](#)

Commitment

- > Full Time
- > Part Time

Align Program Locations:

- [Boston](#)
- [Seattle](#)
- [Silicon Valley](#)
- [San Francisco](#)
- [Portland, Maine](#)
- > [Toronto \(Fall 2021\)](#)
- > [Vancouver](#)

Duration

- > 2-3 Years

Available Concentrations:

- > [Artificial Intelligence](#)
- > [Data Science](#)
- > [Game Design](#)
- > [Graphics](#)
- > [Human-Computer Interaction](#)
- > [Networks](#)
- > [Programming Languages](#)
- > [Security](#)
- > [Software Engineering](#)
- > [Systems](#)
- > [Theory](#)

LEARN MORE →

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