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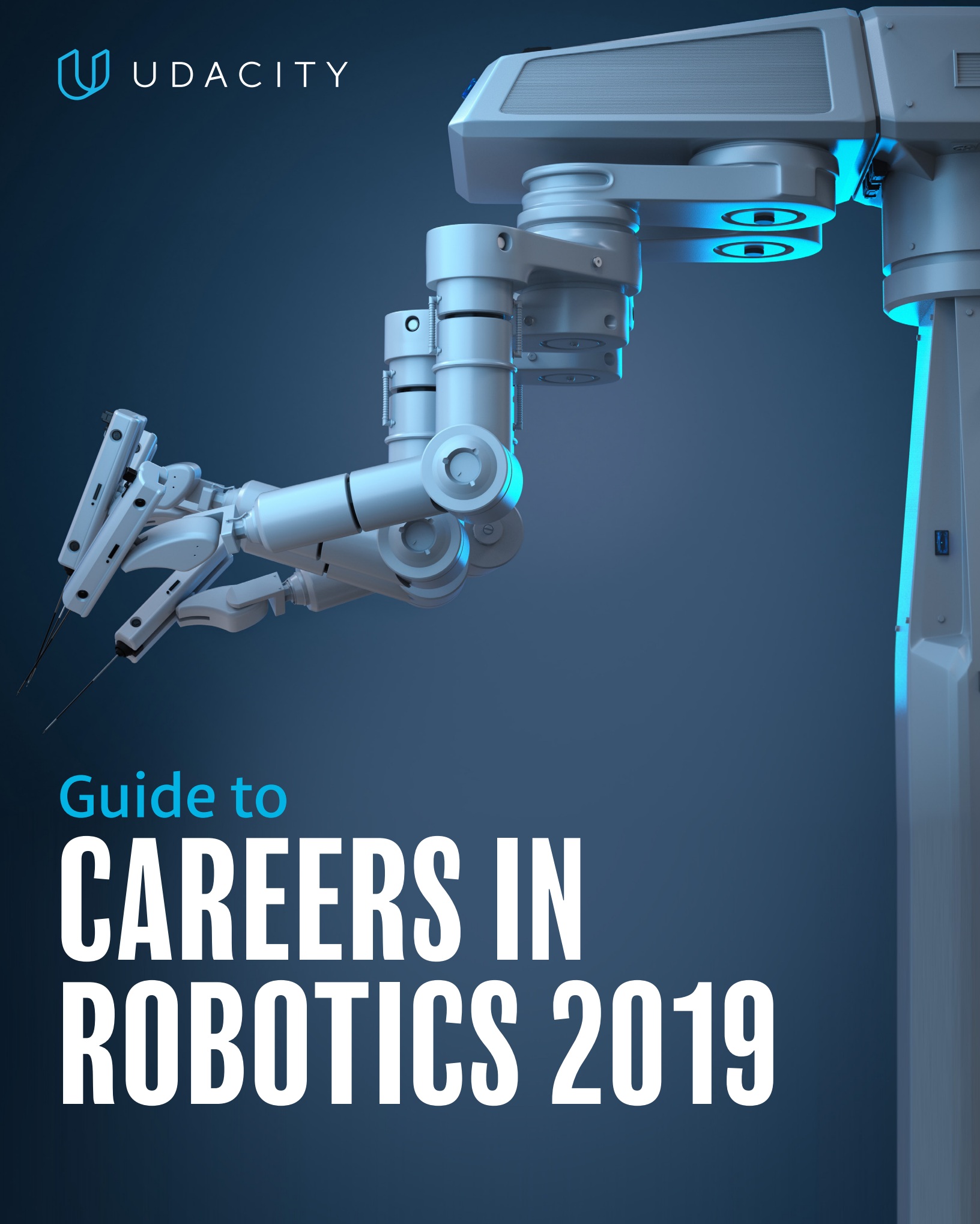

Guide to

CAREERS IN ROBOTICS 2019

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The Robotics Job Market

"Finding an all-encompassing definition of a robot is actually a difficult problem, even for world-class roboticists. Form-factors, intelligence, and the purpose of robots can all vary significantly. And yet many of us think we know a robot when we see one."
—Harvard Business Review

Welcome to the world of robotics! It's a field that is already experiencing hyper-growth, and it's set for an even greater future. Over the next decade, robots are set to revolutionize countless industries—from aerospace and logistics, to manufacturing, the automotive industry, and security.

That makes it a great time to pursue a career in robotics. Right now, major employers are competing to land the best robotic talent, with far more vacancies than qualified candidates. This means that if you have the right practical experience and skills, you can take your pick from a wide range of exciting, high-paying roles.

That sounds like a pretty enticing proposition! But before we get ahead of ourselves, let's answer a fundamental question first—what is a robot? It's a question that is surprisingly hard to find a clear answer to.

If your mind instantly goes to a vision of one of the thousands of robots from science fiction, you probably aren't alone. And actually, your vision may not be that far from reality!

Whatever robots look like, there is no shortage of tech companies interested in pursuing research and development in

"The real-world definition of "robot" is just as slippery as those fictional depictions. Ask 10 roboticists and you'll get 10 answers. But they do agree on some general guidelines: A robot is an intelligent, physically embodied machine. A robot can perform tasks autonomously. And a robot can sense and manipulate its environment."
— WIRED

robotics. For instance, American Robotics, a non-profit founded by Carnegie Mellon University, is leading the Advanced Robotics Manufacturing (ARM) Institute, an organization whose stated 10-year goals include:

- Increasing worker productivity by 30 percent
- Ensuring that 30 percent of small to midsize enterprises adopt robotic technology
- Creating 510,000 new manufacturing jobs in the US
- Providing an ecosystem in which major industrial robotics manufacturers will emerge

Such goals underscore the rising interest in robotics across multiple industries and help to ensure that a career in robotics is a great choice for job seekers around the world.

There are many specialties in the field of robotics, including machine automation, medical robotics, cybernetics, quantum mechanical systems, air traffic management, and more. The huge range of opportunities to work on—and move between—intriguing projects in multiple industries is a big draw for those interested in a robotics career. It is truly an industry growing in complexity and opportunity, so long-term growth prospects for robotics engineers are incredibly strong.

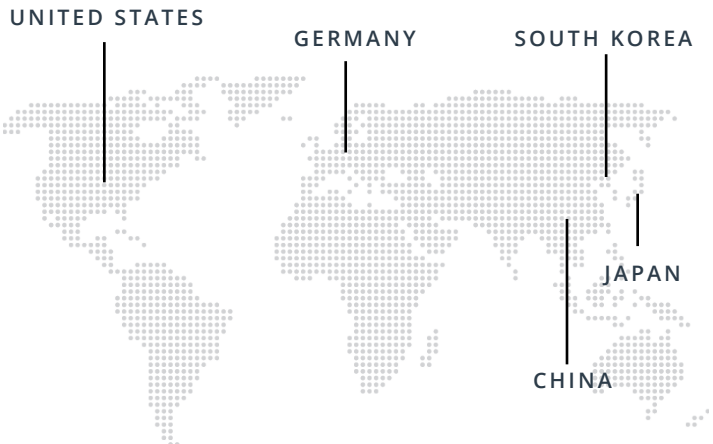
Industry Demand

The robotics field is currently among the fastest growing industries in the world. Investment in the space is surging, as companies and whole industries ramp up spending to keep their technology at the leading-edge. As a result, people with advanced, practical robotics experience are in extremely high demand in the labor market.

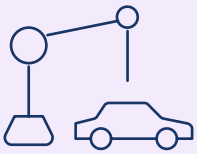
According to CB Insights, 2018 saw a huge rise in funding within the robotics space, with a 60% increase in dollars invested in the industry.

"According to the US Bureau of Labor, the field of robotics engineering is projected to grow by 4% through 2024 while the field of robotics technicians is expected to grow by 1%."
- HIRED

Top 5 Robotics markets, representing 73% of 2017 total robotics sales volume.[1]

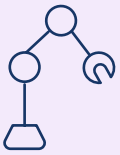


Types of Robots



Industrial Robots

Heavy-duty automation for dangerous jobs; common in auto production since the 1960s.



Cobots

Sensor-laden collaborative robots that can work alongside humans.

AGVs/AMRs

Autonomous guided vehicles for material transport within the warehouse or shop floor.

[1] Robotics Industries Association

Robotics Applications

Almost any industry you could think of is already using robotic technologies, and more are joining them every day. This means there are nearly endless opportunities to work on cutting-edge projects in whatever industry you like!

- **Industrial manufacturing**
- **Warehouse picking and packing**
- **Consumer goods assembly**
- **Food service**
- **Agriculture**
- **Explosives disposal**
- **Medical surgery**
- **Self-driving cars**

Education and Career Prospects

"Main responsibilities as a robotics engineer include approving designs and formulas, debugging programs, performing maintenance on robots, synching them to other devices and managing a team of engineers."
–Electrical Contractor

According to Study.com, there are two common levels of robotics specialists: **technicians** and **engineers**.

Technicians may begin working with an associate's degree and continue their education and skills training on the job or in further study, to build their exposure to robotics tools and skills.

Engineers often begin with a bachelor's degree then build their practical experience working on projects. There are also many more entrants to the world of robotics who come through a less "traditional" route, building on their skills in areas like programming, data, AI, or something entirely different!

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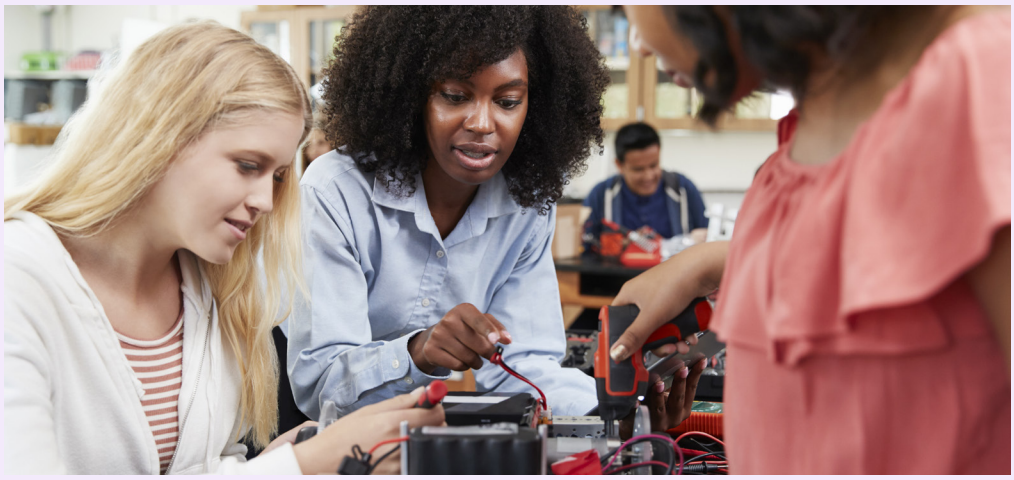

Educational Requirements and Robotics Career Path

Robotiq notes that to start a career in Robotics, at a minimum, you should start with a strong understanding of **Mathematics** and **Physics**. Other subjects to add to your studies:

- Computer Science
- Information Systems
- Product Design
- Design and Technology
- Various Engineering specialties such as Bioengineering, Electronics, Mechatronics, and Mechanical Engineering

Salary and Compensation for Popular Robotics Jobs

Avg salary in US: $96,400-$102,115/yr.[2]

Skills:

- Reinforcement learning
- Computer Science
- Programming languages including C++, ROS, Gazebo, and robotic algorithms
- Machine learning
- Computer vision

[2] Indeed and Glassdoor

Growing Companies in Robotics and Autonomous Systems

iRobot

A brainchild of robotics pioneer Rodney Brooks, iRobot has become one of the leading global consumer robot companies. It produces Roomba, the vacuuming robot, and other home robots.

GreyOrange

GreyOrange has rapidly become a multinational robotics company through its focus on building advanced robotics systems for warehouses, fulfillment centers, and distribution.

Boston Dynamics

Boston Dynamics started as a spin-off from MIT, and has since become world famous for building the first robots that can run and maneuver like animals.

Rethink Robotics

Now part of HAHN Group, Rethink Robotics has built a reputation for building collaborative robots, designed to help manufacturers automate tasks on the factory floor.

Robby Technologies

Robby Technologies builds self-driving robots aimed at making "last-mile deliveries" to customers. Its first-generation robots have already served hundreds of customers in California.

Geek+ Inc.

Based in Beijing, Geek+ is a rising star when it comes to building robots for logistics and warehousing, combining AI and advanced robotics techniques.

Unit Dose One

From its base in Poland, Unit Dose One has created a robotic pharmacy, designed to be used in hospitals to take care of individual patients' medicine doses.

Epson Robots

A leader in industrial robotics, Epson Robots has been building high-precision, specialized robots for numerous industries for over 35 years.

Conclusion

Exploring Your Options in Robotics

Robotics is a fast-growing field with a plethora of exciting specialties, industries, and companies to explore. If you relish problem-solving in a fast-paced, innovative environment, and you want to work on projects that will change the world, robotics may just be the career for you.

To start learning the skills and building the portfolio of projects you'll need to land a career in robotics, take a look at the **Robotics Software Engineer Nanodegree program** from Udacity. It's tailored to meet the exact needs of companies recruiting new talent in the robotics field—focusing on core robotics skills like ROS, Gazebo, C++, and robotic algorithms.