EXPERTS WEIGH IN ON CURRENT JOB MARKET TRENDS

November 30, 2020

Given the change of course that has happened in the world, we wanted to provide expert opinions on what aspiring graduates can do to start off their careers in an uncertain economic climate. We wanted to know what skills will be more important, where the economy is doing relatively well, and if there will be any lasting effects on the job market.

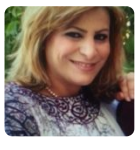
Companies are looking for candidates that can handle the new responsibilities of the job market. Recent graduates actually have an advantage because they are comfortable using newer technologies and have been communicating virtually their whole lives. They can take what they've learned and apply it immediately.

We spoke to professors and experts from several universities and companies to get their opinions on where the job market for recent graduates is heading, as well as how young graduates entering the industry can be adequately prepared. Here are their thoughts.

Our Panel of Experts

Sheldon Logan Ph.D.
University of California, Santa Cruz

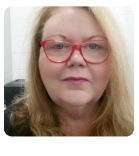
Xun Jiao Ph.D.
Villanova University



Amal Alhosban Ph.D.
University of Michigan-Flint

Richard Grimmett Ph.D.
Brigham Young University - Idaho

Dave Riske
Western Nevada College



Cindy Casey
Gwynedd Mercy University

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Mark Faust
Portland State University

Aniket Bera
University of Maryland

Gagan Agrawal
Augusta University

Marietta Cameron Ph.D.
University of North Carolina at Asheville

John Zobitz Ph.D.
Augsburg University

Edwin Chong Ph.D.
Colorado State University

Md Mahmudur Rahman Ph.D.
Morgan State University

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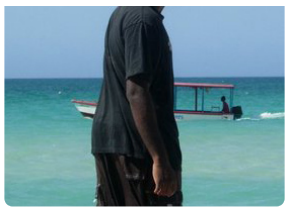
Jeff Kinne Ph.D.
Indiana State University

SHELDON LOGAN PH.D.



University of California, Santa Cruz
Department of Computer Engineering

Website

What general advice would you give to a graduate beginning their career?

Sheldon Logan Ph.D.: Network. The more people you know and the more comprehensive your system, the more opportunities you will be exposed to, in addition to being aware of all that's happening in the field. Technology changes quickly, so you don't want to be blindsided when changes are coming because you were pigeonholed in a specific area and not aware of broader technology trends.

What technology do you think will become more important and prevalent in the field in the next 3-5 years?

Sheldon Logan Ph.D.: Things change quickly in technology (alpha went rapid rise to Go dominancy when most experts predicted that it would be ten years before computers could beat humans at Go, Google translate switching to machine learning, the smartphone revolution, etc.), so it's tough to predict the future. A new invention in the next two years could dramatically change the direction of the field. What if AI writing code improves to a point where they make human code writers redundant? I think it's more important to be a critical thinker/problem solver/fast learner so that you can adapt to whatever changes come. The people who tend to have a long career in technology can quickly learn what's new as opposed to those with in-depth knowledge in a specific field/discipline/technology. If I could predict the future, I wouldn't be a software engineer/professor; I would be buying and selling stocks.

How would you rate the starting salaries for graduates in this field, as well as the salary prospects down the line as they advance in their careers?

Sheldon Logan Ph.D.: Salaries are tricky since there is a vast range of starting salaries in the industries and their composition. In the tech field, wages are compromised of stock, bonus, and base salary. At the larger companies (e.g., Google, Facebook, Amazon, etc.), the combination of those three might be up to 200k for a new grad, but it might be significantly less for smaller companies. These figures can grow into the half a million to the millions range as graduates advance in their careers as a larger portion of your salary becomes stocks. This is the situation now, and it's hard to predict where the industry will be 5 to 10 years in the future, especially as the field becomes saturated. As the supply of computer science/engineer grads increases(every school seems to have bigger and bigger classes each year), and efficiencies increases due to economies of scale (more companies moving to cloud-based solutions), with machine learning/AI improvements, etc., salaries might start trending down. Still, they might also trend up with a smaller cohort, etc.

XUN JIAO PH.D.
Assistant Professor
Villanova University
Department of Electrical and Computer Engineering

Website

In your opinion, what are the biggest trends we'll see in the job market given the pandemic?

Xun Jiao Ph.D.: For the past few years, the most significant trend is in AI-related fields, such as data science and machine learning. The movement will continue and probably, will become even more pronouncing. AI will become deeply integrated into our society. With all things going "virtual/remote," we will need more AI people to build the cyberinfrastructure and perform analysis.

What technology do you think will become more important and prevalent in the field in the next 3-5 years?

Xun Jiao Ph.D.: Two technologies: AI and Security. I have worked in both. These two technologies will fundamentally change everything, from our daily living to national strategy.

Will there be an increase or decrease in demand for graduates in this field in the next 5 years?

Xun Jiao Ph.D.: I think there will be an increase for sure. With the booming of IoT, autonomous driving, robots, E-Commerce, and remote work, the demand will be just increasing.

AMAL ALHOSBAN PH.D.

Associate Professor

University of Michigan-Flint
Department of Computer Science, Engineering and Physics

Website

What type of skills will young graduates need when they enter the workforce in the coming years?

Amal Alhosban Ph.D.: Programming, problem-solving, and critical thinking.

Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Amal Alhosban Ph.D.: Information systems and Computer science graduates could find opportunities anywhere around the world.

How do you envision technology impacting this field in the next 5 years?

Amal Alhosban Ph.D.: It's hard to predict the future of the technology, but we could say all businesses will integrate the Cloud into their organizations.

RICHARD GRIMMETT PH.D.

Professor

Brigham Young University - Idaho
Department of Computer Science Electrical Engineering

Website

What experience really stands out on resumes?

Richard Grimmett Ph.D.: Employers are always looking for lots of great projects. I often have my students put pictures of their projects on the back of their resume. Later, when they look through the resumes, they will show the tasks to others who might also be sifting through the resumes and remember the student and the projects. One of my students was part of a team that recreated one of the omnidirectional wheels like i-robot. Based on the strength of that one project, he got a job at Lawrence Livermore Labs.

How do you envision technology impacting this field in the next 5 years?

Richard Grimmett Ph.D.: What we do is technology. It is rewriting almost every field; agriculture, entertainment, health care. Our students sit in an exciting space where hardware meets software. There are so many different fields, technical specialties, and roles in so many other companies that the opportunities are almost endless. Do you want to work for NASA? You want to work for Caterpillar; you want to work for Google, work for EA Sports, and work for the FBI?

Will there be an enduring impact of the coronavirus pandemic on graduates?

Richard Grimmett Ph.D.: For us, it is only a bit of a bump in the road. Employers are still hiring; the only real impact has been on internships, which are difficult to do remotely.

DAVE RISKE

Professor, Computer & Information Technologies

Western Nevada College

Professional and Applied Technology

Website

What type of skills will young graduates need when they enter the workforce in the coming years?

Dave Riske: Computer Tech always breaks along a couple of significant skill sets, and those tend to divide along with the hardware and the software.
On the hardware side, you can design, build, maintain, and secure the physical and logical infrastructure that enables computers and computer networks to communicate effectively and securely.

On the software, the side is those who can program (code) and develop systems that allow us to use computers and networks, for whatever purpose the programmers can dream up, whether it be areas of big data analytics, real-time collection and processing of sensor data (self-driving cars as an example), the expanding areas of AI/ML, e-commerce, logistics, manufacturing, e-records... and of course, all of this must be done with security as a driving factor. Of course, these areas aren't mutually exclusive, so students need a good foundation in skills that will enable them to investigate their particular areas of interest to a greater depth.

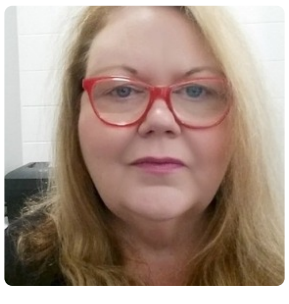
Having said all that, the most significant skill for anybody in this career field is the ability to adapt and learn whatever changes that the field demands. Technology and technological innovation never sleep. There will always be change, and that change is happening at an ever-increasing pace.

Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Dave Riske: Computer Tech is ubiquitous today. There is not a single economic sector and, therefore, not an available geographic area that does not include jobs necessary to the digital infrastructure. Some rooms have drawn more significant numbers of people who share interests and talents for this particular study area. Still, as an industry that supports and enables every human endeavor on the planet, work is where you are.

How do you envision technology impacting this field in the next 5 years?

Dave Riske: Change is the one thing that can be guaranteed. For example, Mobile access to data and the internet is now more prevalent than PC access. This drives developers to shift their priorities in what and how they work on things. It prompts network designers to change their perspective on what a network is and how it's supposed to function. And it drives businesses to rethink their need for data, where that data is derived, and how that data can be used.
Sensors, Manufacturing, Blockchain, 5G, AI and ML, 3D Printing, BIG Data, all of these technologies have severe implications for our definitions of what Computer Tech is and how we approach how to prepare the next generation of workers.



CINDY CASEY

Instructor and Program Coordinator

Gwynedd Mercy University

Department of Computer Information Science

Website

What type of skills will young graduates need when they enter the workforce in the coming years?

Cindy Casey: Graduates today need technology skills. Even students who are not majoring in computing and technology should be familiar with the fundamentals of artificial intelligence and machine learning. We use AI every time we read our email, ride in an Uber, or perform a Google search. Those who do not want to major in computer information science should consider a minor in computing. It will not only prepare them for the future, regardless of what their major is, but it will make them a more valuable employee.

Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Cindy Casey: Because so many technology jobs can be performed remotely, graduates entering the workforce today are not limited by their geographical area. Working from home is becoming the norm and has been accelerated by the coronavirus. Students with programming, cybersecurity, and other computing skills do not need to relocate for a career, and should not feel the need to narrow their searches down to anyone or two locations.

How do you envision technology impacting this field in the next 5 years?

Cindy Casey: Technology is transforming the way humans and machines interact. Artificial Intelligence and machine learning will not only redefine the human experience, but it will impact every industry. From autonomous cars and manufacturing robots to virtual nursing assistants and AI banking applications, machine learning will have a major impact on society and technology.

MARK FAUST

Assistant Professor

Portland State University

Electrical and Computer Engineering Department

Website

What type of skills will young graduates need when they enter the workforce in the coming years?

Mark Faust: Naturally, technical skills and knowledge are required, but needs for a specific programming language or microprocessor architecture or FPGA platform experience is transitory and, in any event, can be learned if someone already has experience with a different one. Instead, what our partners (whether capstone project sponsors, internship program recruiters, or our industry advisory board) repeatedly tell us is that they're looking for students/recent college grads with the ability to work on teams and who can communicate well and effectively.

These skills are in even greater demand during COVID, when many teams aren't able to meet in person. Even before COVID made it absolutely necessary, geographically dispersed teams have been the norm in many fields, and people who aren't daunted by working across timezones and cultures, are particularly in demand. We try to not only teach these skills but give students practical experience exercising them by working on team projects, as early as a sophomore year, and culminating in their "practice" and a senior capstone project. Midway through the 2019-2020 academic year, we pivoted all capstone projects that were underway to eliminate face-to-face meetings. Most teams were already using tools like Slack, and video conferencing (e.g., Google Hangout, Skype, FaceTme, Zoom) and adapted pretty well. We moved from having an in-person poster session and demonstrations, to conducting the entire event on-line with stringent time constraints, requiring students to be particularly concise and efficient communicators.

Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Mark Faust: Suppose you're speaking of geography, that's obviously become less of an issue when engineers don't need to, or are prohibited from, in-person, face-to-face interaction. However, the Portland area; SF Bay Area; and Austin, TX, are particularly strong.

How do you envision technology impacting this field in the next 5 years?

Mark Faust: Based upon our own experience, providing access to lab instrumentation in our undergraduate courses, which cannot physically meet in our traditional undergraduate circuits labs, and some early industry experiences, I think that remotely accessed H/W and S/W tools will become more prevalent. Providing either robotic or other remote access to lab instrumentation, automated test equipment (ATE), and simulation accelerators will, I think, become more commonplace. I also imagine continued efforts to better integrate collaboration tools (on-line calendar, project and task management, video conferencing, virtual whiteboard/drawing tools.

ANIKET BERA

Assistant Research Professor

University of Maryland

Departmet of Computer Science

Website

What type of skills will young graduates need when they enter the workforce in the coming years?

Aniket Bera: Yes. Although fields using AI and modern technologies (like Computer Science and Engineering degrees) will be less affected, as there is still a huge requirement for such skillset in the industry, yes, in the short term, recent graduates may find it hard to find jobs with many companies having a hiring freeze. I'm hoping this is temporary, and things will start getting better after Spring.

Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Aniket Bera: Most Robotics companies hire folks from both Mechanical Engineering and Computer Science, and I see that industry is exploding in the next few years. As automation grows with big companies like Amazon and Google investing in warehouse automation or even person-less deliveries or autonomous vehicle companies, the demand for students with experience in mechanical engineering and AI will rise.

How do you envision technology impacting this field in the next 5 years?

Aniket Bera: As I mentioned earlier, technology will have a significant impact on this field in the next 5-10 years. As more and more technologies are interdisciplinary, mechanical engineers would need more machine learning experience. Many processes in the manufacturing industry require Mechanical Engineering to be done with components, products, processes, etc. Artificial Intelligence is currently used in similar processes of Mechanical Engineering.

GAGAN AGRAWAL

Professor

Augusta University

Department of Computer & Cyber Sciences

Website

What type of skills will young graduates need when they enter the workforce in the coming years?

Gagan Agrawal: I feel that the skill set needed in computing fields has held quite steady for some amount of time now. You will need a combination of basic software and problem-solving links. You need the ability to work on projects with others and learn new languages or technologies on your own. Communication skills are always important. Companies like graduates who have taken the initiative and done projects outside classwork - this shows that you really enjoy work, and you are motivated and driven.

Lately, there are specialized sectors like security or Artificial Intelligence/Machine Learning that are seeing a lot of action. If you want to be in either of those spaces, you need to take electives accordingly and probably do projects in these areas on your own (and/or possibly take online classes). But then, there are classical areas, like database programming, that still employ many.

Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Gagan Agrawal: Computing related field graduates have found jobs in almost all geographies. Moreover, work from home is getting very common, as are geographically dispersed project teams. So, I think job opportunities are available everywhere.

How do you envision technology impacting this field in the next 5 years?

Gagan Agrawal: I think big developments that are coming are the Internet of Things (IoT), wearable computing, specialized chips, and so on. So I think greater knowledge of systems and architecture will become important for application development. I also feel that two big topics of today - security and AI/ML will continue to see a lot of action for a while.

MARIETTA CAMERON PH.D.

Chair & Associate Professor of Computer Science

University of North Carolina at Asheville

Deaprtment of Computer Science

Website

Will there be an enduring impact of the coronavirus pandemic on graduates?

Marietta Cameron Ph.D.: The COVID-19 pandemic presents an enduring impact on all of us, regardless of our various identities in or outside academia, our disciplines, and our industries. Our Spring 2020 graduates saw their class schedules abruptly disrupted; their co-curricular activities abruptly ended, their graduation celebrations morphed into virtual shadows of the usual congratulatory expressions. Some experienced direct battles with COVID-19, in terms of their own health. Some have lost dear relatives and friends. Some lost their jobs. Many have watched the number of entry-level positions plummet. Many have discovered that, counter to intuition, jobs in computing are not immune to the effects of COVID-19.

Abrupt, unexpected challenges bring a rethinking of priorities and values. From studies of previous recessions, we know that graduates launching their careers in a bad economy may find themselves dealing with health and long-term financial issues. This pandemic challenges our graduates and their prospective employers to consider how the workplace will address salary, economic benefits, healthcare, childcare, and/or eldercare. Employers and graduates must consider how the technologies they produce will uplift our society locally, nationally, and globally.

Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Marietta Cameron Ph.D.: Covid-19 has demonstrated that workers can be productive in a virtual environment. I suspect that companies will prioritize policies, practices, and funding on initiatives that will focus on family, teamwork, and community cares, rather than amenities within a physical location. I advise graduates to seek out companies based on their desired values, rather than location. If money is a priority, the U.S. Department of Labor site, for each occupation, offers interactive maps that display the average salary, by regions, in the United States.

How do you envision technology impacting this field in the next 5 years?

Marietta Cameron Ph.D.: In my previous answer, I mentioned that COVID-19 had caused a decline in the number of entry-level positions in I.T. Some good news is that the Occupational Outlook Handbook of the U.S. Bureau of Labor Statistics projects that over the next decade, employment in computing will grow at a rate that is much faster than average for other occupations. More good news: Computer Science is the field that innovates technologies that impact other fields. COVID-19 has prompted developers to produce applications in the detection, diagnosis, treatment, contact tracing of the disease, data visualization, prediction models, cyber-security, just to name a few. These innovations will not disappear when COVID-19 does. These innovations will be adapted and expanded to deal with other diseases and issues.

JOHN ZOBITZ PH.D.
Professor
Augsburg University
Department of Mathematics, Statistics, and Computer Science
Website

Will there be an enduring impact of the coronavirus pandemic on graduates?

John Zobitz Ph.D.: Yes, but a lot of that depends on the pace of economic recovery. I anticipate that a required job expectation, moving forward, will be the ability to demonstrate effective skills for team collaboration online. (I have a little bit more to say about that in #3).

How do you envision technology impacting this field in the next 5 years?

John Zobitz Ph.D.: Technology is enabling teams, in different locations, to work together. Graduates will need to develop skills for online presence, along with collaboration and teamwork in a virtual environment. Engagement and participation are different online, compared to in-person engagement and participation - and perhaps, require a stronger degree of self-advocacy than being in a physical workplace.

EDWIN CHONG PH.D.

Professor of Electrical and Computer Engineering Professor of Mathematics

Colorado State University

Website

Will there be an enduring impact of the coronavirus pandemic on graduates?

Edwin Chong Ph.D.: Yes, almost certainly, and some of these impacts will be positive.
First, there will be an enduring impact on how things are done, from online learning to work from home.

Second, the nature of the marketplace for jobs will likely be changed permanently. In particular, the relative abundance of jobs in different parts of the economy will change. The pandemic dramatically accelerated the progress in specific industries, such as online interaction and entertainment. What used to take years to transform took only a matter of months because of the pandemic.

Third, education itself has been impacted in an enduring way, and this is likely to change the nature of the labor market as accessibility to learning opportunities increase. For example, mathematics is a field particularly suited to this new form of delivering knowledge and skills.

Fourth, what people know how to do and are used to doing will change forever. This includes having some meetings online and is one of the positive impacts-we will save a lot of time and energy traveling long distances for short sessions.

Finally, the future workplace is likely to place greater emphasis on mitigating the spread of diseases in general, which should reduce the number of sick days.

Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Edwin Chong Ph.D.: Interestingly, I think that the changes brought about by the pandemic have made being in specific locations a less critical factor in finding work opportunities, especially in fields such as mathematics and computer science. Moreover, the dominance of urban centers as a source of job opportunities will likely diminish. This is good news in many ways.

How do you envision technology impacting this field in the next 5 years?

Edwin Chong Ph.D.: Online-communication software has already made an impact on our way of studying and working. Online technology will help to streamline many bureaucratic processes in the workplace. The need for people to use computers at home will also increase the use of at-home broadband Internet services and computing hardware and peripherals. Vendors old and new will enter the market to take advantage of the new demand for such products and services, helping speed up more advanced technologies.

MD MAHMUDUR RAHMAN PH.D.

Associate Professor of Computer Science

Morgan State University

Computer Science Department

Website

Will there be an enduring impact of the coronavirus pandemic on graduates?

Md Mahmudur Rahman Ph.D.: Yes, there will be some long-term impact for graduating amid the coronavirus pandemic with the death of almost 190K Americans and millions of jobless people.

It might have a lasting impact on their memories (virtual graduation ceremony!) and their view of what it means to have a functional society where the pandemic represents a crisis of a lifetime and a defining moment.

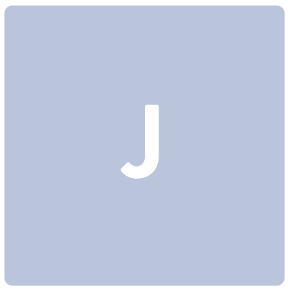
Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Md Mahmudur Rahman Ph.D.: For any CS graduates, generally, Silicon Valley is the first choice, followed by the DC metro (DMV) area and New York to find work opportunities in tech, defense, and cyber security-related industries. For Morgan students, the local market (Baltimore and DMV area) seems to be the right place due to the existence of a vibrant IT industry dominated by government labs and private contractors (such as Northrop Grumman, Lockheed Martin, Deloitte, etc.).

Due to the pandemic, many Big Tech industries (Google, Facebook, Twitter, etc.) recently announced their plan to work from home this year and next year (some even thinking about it indefinitely). As a result, the location might not be a concern now for our graduates as long as they can secure a job during this difficult time and work from anywhere!

How do you envision technology impacting this field in the next 5 years?

Md Mahmudur Rahman Ph.D.: I envision that within the next five (5) years the world will see transformational changes in how technology impacts our lives with further advancement and commercialization of AI and machine learning technologies in the fields of precision medicine, autonomous driving technology, cybersecurity, manufacturing, renewable energy, virtual reality, smart home, and city, etc. Also we will probably see practical deployment of Internet of Things (IoT) and increased demand for edge computing processing power with the commercialization of quantum computing.



JEFF KINNE PH.D.
Professor and Associate Chairperson of Computer Science
Indiana State University
Computer Science
Website

Will there be an enduring impact of the coronavirus pandemic on graduates?

Jeff Kinne Ph.D.: The pandemic has impacted job placements in computer science right now, with students having a more difficult time than usual in finding their first positions. However, I think that this is a temporary impact for computer science, similar to other economic downturns. Simply put, computer science has been a growing area in terms of jobs before the pandemic and will continue to be so.

Are there any particularly good places in the United States for graduates to find work opportunities in this field after they graduate?

Jeff Kinne Ph.D.: ISU graduates have continued to end up getting jobs primarily in the midwest but also throughout the country. I don't see this changing-computer science is an area in demand everywhere, which will continue to be the case.

How do you envision technology impacting this field in the next 5 years?

Jeff Kinne Ph.D.: Data science has been the hot area over the past few years, and I think this will continue. There will continue to be increased interest in data science, data analytics, machine learning, artificial intelligence, etc.

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