### The Impact of Al On Job Roles By Robert Ferrell

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Pilot Shortage Continues





The Technology Association of Georgia Education Collaborative (TAG-Ed) strengthens the future workforce by providing students with relevant, hands-on STEAM learning opportunities and connecting them to Technology Association of Georgia (TAG) resources. Formerly the TAG Foundation, TAG-Ed is a 501(C)(3) non-profit organization formed by TAG in 2000. Later, the organization's name was re-branded to TAG Education Collaborative to facilitate our role as the leaders for K-12 STEAM education in Georgia.

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# GHC Student Receives National DAISY Nursing Award

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### Hidden Social Media Structures

CATHY XUANCHI LIU TRISTRAM J ALEXANDER EDUARDO G ALTMANN SCHOOL OF MATHEMATICS, PHYSICS AND STATISTICS, UNIVERSITY OF SYDNEY, AUSTRALIA

### Pilot Shortage Continues WAYNE CARLEY

Unlocking Opportunities: Tech Apprenticeships as a Pathway to Inclusive Careers





In an era where technology is rapidly evolving, the demand for skilled professionals continues to soar. Traditionally, launching a career in technology required a college degree, creating a barrier for individuals who did not, or could not, follow this conventional path.

This is why apprenticeship programs are undergoing a modern renaissance to offer a unique and accessible way to help individuals seeking opportunities in the technology sector. We're embracing this educational transformation with our TAG Bridge Builders Tech Apprenticeship Program – an innovative approach that provides a bridge to the tech industry for those without traditional college degrees.

Programs such as ours with TAG Bridge Builders create a simplified path to qualified and certified talent, plus help to develop a new pipeline of untapped talent while strengthening the tech ecosystem. The training prioritizes hands-on, practical application over academic qualifications, allowing participants to develop crucial skills in software development, IT, cybersecurity, and more. Unlike traditional education paths, apprenticeships focus on real-world problems, immersing individuals in the actual work environment and the challenges they will encounter in their future careers. By emphasizing practical experience and skills acquisition, apprenticeships create a level playing field, allowing talent to shine irrespective of formal education. This approach is particularly beneficial for those who prefer hands-on learning, as it allows them to build a strong foundation in a specific tech domain while simultaneously gaining valuable workplace experience.

Tech apprenticeships are a launchpad for historically disenfranchised individuals. By providing hands-on training, practical skills, and a gateway to diverse talents, these programs redefine the narrative of who can succeed in the tech industry. As we navigate the ever-changing landscape of technology, embracing the inclusivity of tech apprenticeships is not just a choice but a necessity for building a dynamic and resilient workforce. For more information on our TAG Bridge

Builders Apprenticeship Program, visit our website:

https://www.tagonline.org/bridge-builders/ tech-registered-apprentice/

Larry K. Williams President TAG / TAG-Ed

Larry K. Williams serves as the President and CEO of the TAG and the TAG Education Collaborative. TAG-Ed's mission is to strengthen Georgia's future workforce by providing students with relevant, hands-on STEM learning opportunities by connecting Technology Association of Georgia (TAG) resources with leading STEM education initiatives. Building relationships is what you do... Let ThisWay<sup>®</sup> & Watson Orchestrate eliminate the work that gets in the way.

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1 Source: US Bureau of Labor Statistics

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The Impact of AI on Job Roles, Workforce, and Employment: What You Need to Know

By Robert Ferrell / Innopharma Education

Artificial Intelligence (AI) is changing the job market, creating new types of jobs while automating routine tasks. With 20-50 million new jobs expected by 2030, AI is creating and enhancing jobs in healthcare, pharmaceuticals and other industries.

While some industries may experience significant job displacement, the economy is expected to benefit from increased productivity and output. As AI continues to evolve, understanding its impact on employment and the economy is crucial. AI is rapidly transforming the workforce, with significant changes already apparent in the job market and employment landscape. As AI continues to develop and evolve, businesses and workers must adapt to stay competitive and efficient. We will explore how AI is affecting the workforce, how it can help workers and businesses become more effective, and the potential benefits and drawbacks of implementing AI on a larger scale.

### Impact of AI on Job Roles

The rise of automation and AI is transforming the workplace, impacting job roles across various industries, including high-tech manufacturing. Thanks to advanced technologies, many manual and repetitive tasks can now be automated, leading to increased efficiency and productivity.

But this shift is also causing job roles to evolve, with some becoming obsolete while new ones emerge. For example, manufacturing workers need to acquire new skills to operate and maintain machines and robots that are taking over manual tasks. Additionally, AI integration into high-tech manufacturing processes is creating new job roles like data analysts, AI programmers, and machine learning specialists.

These emerging job roles require a combination of technical skills and a deep understanding of business processes. The jobs of the future will require a mix of technical skills, creativity, and adaptability to leverage the power of automation and AI effectively. As AI continues to transform the job market and employment landscape, individuals need to adapt to stay relevant and competitive in their careers. One way to adapt is to focus on developing skills that are in high demand, such as data analytics, machine learning, and programming. This can involve taking courses, attending workshops, or earning certifications in these fields.

Another way to adapt is to embrace the opportunities presented by AI, such as using it to augment human capabilities and work more efficiently. This may involve learning how to work with AI tools and technologies and collaborating with AI systems to achieve better results.

Additionally, individuals should stay informed about the latest developments in AI and its impact on their industries. This can involve following industry publications, attending conferences, and networking with peers and experts.

Finally, individuals should remain flexible and adaptable, as the job market and employment landscape continues to evolve rapidly in response to AI and other technological advances. By embracing change and continually developing their skills and knowledge, individuals can thrive in a world where AI is transforming the way we work.

### Impact of AI on the Workforce

AI's impact on the workforce is multifaceted. It involves the automation of repetitive and routine tasks, changing skill requirements, and job displacement. This can be beneficial for employees as it frees them up to focus on more complex and creative work, but it can also create concerns about job displacement and changes in the demand for certain types of jobs. However, AI is also creating new job opportunities, especially in data analytics, machine learning, and AI development.

Despite these potential benefits, there are also concerns about the drawbacks of implementing AI on a larger scale in the workforce. One potential concern is job displacement, which can lead to unemployment and the need for reskilling and upskilling. Another concern is the potential for bias and discrimination in algorithms, which can have negative consequences for marginalized individuals and communities. Privacy and security are also major concerns regarding the impact of AI on the workforce. As AI becomes more advanced, it is important to ensure that personal data is protected, and AI systems are secure against cyberattacks. Nonetheless, AI can also enhance efficiency and productivity, and its advancements may lead to new job opportunities for workers with the right skills and knowledge.

### Impact of AI on Employment

Artificial Intelligence (AI) is changing the job market, creating new types of jobs and enhancing existing ones. As AI continues to develop and evolve, it is important to understand how it is impacting the job market, the types of new jobs that are emerging, and the potential impact on unemployment rates and the economy as a whole.



According to a report by McKinsey & Company, AI is expected to create 20-50 million new jobs globally by 2030. These new jobs will be in a range of industries, including healthcare, manufacturing, and finance. Some of the new job roles that are emerging as a result of AI include:

• AI Trainers and Teachers: These are individuals who are responsible for training and teaching AI systems. They ensure that AI algorithms are accurate and effective, and they also develop new AI applications and systems.

• Data Analysts and Scientists: With the increase in data generated by AI systems, there is a growing demand for individuals who can analyze and interpret this data. Data analysts and scientists use AI tools to analyze data and identify patterns and insights that can help businesses make better decisions.

• Human-Machine Teaming Managers: As AI becomes more integrated into the workplace, there is a growing need for individuals who can manage the interaction between humans and machines. Human-machine teaming managers ensure that AI systems work effectively with human workers, enhancing productivity and efficiency.

• AI Ethics and Policy Specialists: As AI becomes more prevalent, there is a growing need for individuals who can address the ethical and policy implications of AI. AI ethics and policy specialists ensure that AI systems are developed and used in a responsible and ethical manner.

AI is creating new job opportunities that require skills such as critical thinking, creativity, and problem-solving. Artificial Intelligence is also enhancing existing jobs by improving accuracy and precision in many tasks, such as quality control and data analysis. For example, in healthcare, AI is being used to assist doctors and nurses with diagnosis and treatment recommendations, improving patient outcomes and reducing the workload of healthcare professionals.

The impact of AI on unemployment rates and the economy as a whole is a topic of debate. While AI is creating new job opportunities, it is also leading to job displacement, particularly in industries that rely heavily on routine and repetitive tasks.

According to a report by the World Economic Forum, by 2025, AI will have displaced 75 million jobs globally, but will have created 133 million new jobs. This means that there will be a net gain of 58 million jobs globally, but there will still be significant job displacement in certain industries.

The impact of AI on unemployment rates will also vary by region and industry. For example, the manufacturing industry is likely to experience significant job displacement as a result of AI, while the healthcare and education industries are expected to see significant job growth. AI also has the potential to impact the economy as a whole. AI can lead to increased productivity and output, which can stimulate economic growth. However, there are concerns about the potential for AI to widen the wealth gap, as those with the skills and knowledge to work with AI may earn higher salaries than those who do not have these skills.

Automation and AI are changing the way we work, and we are beginning to see significant impacts across various industries. While certain job roles are at risk of being automated, others are evolving to include the use of AI. As the use of AI continues to grow, it is essential that we take a proactive approach in ensuring that the benefits of AI are balanced with the needs of workers and society as a whole. We must ensure that we are adequately prepared to adapt to the changes in the job market and acquire new skills to thrive in the digital age. It is crucial to address the potential loss of jobs due to automation. We must develop strategies that support workers who are at risk of displacement and ensure that they have access to training and education to equip them with the skills needed to adapt to new job roles. By leveraging the full potential of AI, we can create new job opportunities, drive economic growth, and make significant strides in addressing some of the world's most pressing challenges.

The impact of AI on job roles is significant and far-reaching. It is essential to approach this transformation proactively, ensuring that the benefits of AI are balanced with the needs of workers and society.





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# GHC Student Receives National DAISY Nursing Award

Marjorie Liciaga Rodriguez, a nursing student in the Atrium Health Floyd School of Health Sciences at Georgia Highlands College (GHC), recently received the DAISY Award, a national award from the DAISY Foundation.

Any licensed, registered nurse, nursing faculty or nursing student is eligible to be nominated for a DAISY Award. According to its website, DAISY partners with healthcare facilities across the continuum of care, such as large health systems, clinics, long-term care facilities, surgery centers, critical access and rural hospitals, schools of nursing and more. The organization's recognition programs express gratitude to nurses wherever they practice, in whatever role they serve, and throughout their careers - from nursing student through lifetime achievement.

Being recognized for this accomplishment brought Rodriguez to tears. "I felt deeply humbled to know that someone took the time to vote for me," Rodriguez said. "I work with an amazing group of nurses, so naturally, I believed the ladies that came to present were there to present one of them with the award."

She added, "This award means that my hard work, my dedication and my sacrifices are seen and that it is all leading me to a path that serves a higher calling that I am seeking to fill."

Her goals as a nurse include creating a positive impact on others while embracing her compassionate spirit and setting an example for her children. "I often feel like care and compassion is missing, so why not spread that around some? My caring and compassionate spirit yearns to be let out," she said.

Reflecting on her education thus far,



Rodriguez said every classroom experience, project, lecture, simulation lab and clinical rotation holds a story. "First semester experiences tested my character. I found this helpful because it tested me as a person and challenged me to grow and mature," Rodriguez said. "Second semester experiences proved that learning is never-ending. This last semester is teaching me that motivation and determination go hand in hand."

She continued, "The most helpful and interesting parts of the program are the clinical rotations. This is where you can apply what you learn during lectures and sim labs in a real-life setting."

Motivation and determination are necessary for anyone considering enrolling in the nursing program, Rodriguez said. "If an individual is both motivated and determined, I would say, "Do it" – what are you waiting for?" Rodriguez said.

Rodriguez plans to graduate in spring 2024 and will continue her education with GHC. Her next steps are to earn a Bachelor of Science in Nursing (BSN) while completing a nursing residency program with her employer, Wellstar Health System, who nominated her for the award.

"I would really like to thank every nursing instructor at GHC. Every instructor that I have come in contact with has always had my best interest in mind," Rodriguez said. "They are all different and they all have taught me unique lifelong lessons."

Access your future at GHC and start classes this spring with no application fee through January 11. Connect with an admissions counselor at:

go.highlands.edu or enroll today at

apply.highlands.edu



### The Turtle Rescuers

By Jean M. Wallace

Only seven species of sea turtles can be found in the oceans of the world, five of which are found in the waters off Georgia's coast. The loggerhead (Caretta - caretta) is the only species to nest here regularly on islands such as Jekyll, Sea, Sapelo, Ossabaw and other barrier islands. The other four species, including the hawksbill (Eretmochelys imbricata), Kemp's ridley (Lepidochelys kempii), green (Chelonia mydas) and leatherback (Dermochelys coriacea), prefer more tropical nesting locales yet use the Georgia coast for food and shelter and as a travel corridor to other destinations.

All five species of sea turtles found in

Georgia are protected by state and federal law, principally by the Endangered Species Act. The Kemp's ridley is the most endangered of the sea turtles, but all species are at risk. The loggerhead is listed as threatened worldwide and is the focus of much of the Nongame-Endangered Wildlife Program's sea turtle conservation efforts along the coast.

The loggerhead is completely adapted to life in the ocean and depends on land only for reproduction. Only the female returns to the beach. When female turtles reach maturity (15-30 years), they leave the water and dig a nest in the sand on the beach, deposit the eggs, cover the nest, then return. to the water. Experiential learning is STEM in action. This type of learning not only allows for integrating across subject areas but ensures that students are actively engaged in tasks that connect in-class learning to real-world problems and solutions. It may seem simple, but when students are able to relate school learning to real-life issues, both academics and classroom dynamics improve. Students remain focused and motivated when they clearly see a purpose to their learning.

After spending decades in various aspects of experiential environmental education, what I miss most is witnessing those "aha" moments when students transform from passive learners to active participants wanting to do all they can to make a difference. As someone who loves being in nature, I never stop learning about the world around me.

When I travel to a new place, I make it a point to explore the local wildlife, learn about the environmental challenges they face, and reach out to meet the good people who rescue, rehabilitate and return wildlife to their natural habitat. As a former wildlife rehab volunteer, I value the work of rehab experts.

As an educator, I am always interested in how organizations partner with local schools and engage students.



### **Manatees and Marine Science**

As one example, on a recent visit to New Smyrna Beach, Florida, a friend and I kayaked the Indian River with expert guides from the Marine Discovery Center. We discovered the local flora and fauna and learned of the alarming number of manatees dying of starvation caused, in part, by the overfertilization of lawns. It was alarming to hear how fertilizer runoff enters the river causing a chain of events leading to a decline in a vital food source for manatees.



After kayaking, we were fortunate to be given a behind-the-scenes tour of The Marine Science Center (MSC) in Volusia County.

While here we heard about the Center's efforts to add additional space for educational programs and saw, firsthand, the critical work the Center does rehabilitating wildlife. When asked about school projects, we learned of a wonderful collaboration MSC had with one very special teacher and her, then, first grade class at R.J. Longstreet School in Daytona Beach, Florida.

### **The Turtle Rescuer Project**

Ms. Carly Stasa has been a teacher for 18 years. She currently teaches first grade at Old Kings Elementary School in Flagler County, Florida. Prior to teaching at Old Kings, she worked at Longstreet Elementary in the Daytona Beach area.



While there, she partnered with MSC on a very special project. Her students were known as "The Turtle Rescuers." Through this project, Ms. Stasa's integrated approach to academics provided her students a purpose for learning and created opportunities for them to show empathy for local wildlife; even raising money for medical equipment for injured turtles. Students were engaged, test scores improved, and classroom dynamics enhanced as students transferred this empathy for wildlife to their fellow classmates. Whether in the classroom or on the playground, the act of caring grew exponentially as the turtle project played out.

### A Move to Flagler County

When a personal situation meant a move to a new school and classroom, Ms Stasa was thrilled at being able to bring The Turtle Rescuers project to Old Kings Elementary School. Flagler County Schools and their science department has always had a strong passion for sea turtles. They have traveling turtle trunks from Inwater Research Group and these trunks offer the students a hands-on experience where they can sample a population and collect data from their very own life like sea turtle, including measuring and weighing.

Each turtle is equipped with a tag that matches a QR code which tells the story of the turtle's journey. From in-class learning to the real-world, the students were able to witness nature in action when they visited a turtle's nest adopted by their school. While at the beach, they helped count the eggs and even saw 5 hatchlings make their way to the ocean! According to Ms Stasa, "This was a great opener to start our





program. I am already seeing their love for the world around them, and they already have such a tight bond."

As an enrichment program, Old Kings Elementary school also has a marine science club, that Ms Stasa will facilitate. This club offers third through fifth grade students the opportunity to engage in additional experiential learning projects where they will educate others about local wildlife and marine science.

### **Experiential Learning and STEM**

In these days of high-stakes testing, with Math and Reading taking up a good deal of class time, how does Ms Stasa fit this project into her school year? While she has the flexibility to bring in outside resources, she is required to follow the school's academic standards in science. Partnering with local science organizations is key. After doing their own, in-class research, the students get to meet with marine



experts and get an up-close look at sea turtles. They also learn about the issues impacting turtles and other wildlife, what they can do to help, and how certain issues could easily be prevented if humans simply threw their trash in a receptacle and not on the beach.

Decades of research prove time and again how authentic, real-world learning can transform teaching and learning. Experiential learning and STEM go hand-in-hand. Yet, few teachers and schools take full advantage of the ways in which expert partnerships make these projects come to life for students. Whether a zoo, museum, nature center or wildlife rehabilitation center, there are so many organizations just waiting to build real partnerships with schools.

# Academic and Social / Emotional Benefits

Rather than the one-off field trip that has little impact on quality learning, developing expert partnerships results in deeper learning when students have ongoing access to scientists, see how their learning is connected to their world and given a purpose – an opportunity to make a difference in the lives of local wildlife. As Ms. Stasa has witnessed, not only do academics improve, but the social-emotional benefits of environment-based experiential learning allow young children to spend time outdoors with nature. Something the experts agree is diminishing with each new generation.

On a personal note, as the former CEO of a successful public charter school in Philadelphia, I worked with an incredible team of educators to design and implement an award-winning experiential learning program. Our K-8 curriculum, based on integrated action-oriented learning, was recognized locally, statewide, nationally and even internationally for excellence. I firmly believe in this way of learning and of parents to have the option to choose a child's learning environment. Not because the choice is one of traditional public vs private or charter, but because the choice is one of how and what a school is teaching, and how parents can engage their child in opportunities like The Turtle Rescuers of Flagler County.

All children should have access to real-world learning. The benefits are clear. Should schools present excuses for why experiential learning just isn't possible, remind them about Ms. Stasa and her elementary students. Not only is it possible, but it is also necessary. Ms Stasa summed it up nicely by telling me, "The impact I have seen over the years in my classrooms is huge.



# New **programmable** smart fabric responds to temperature and electricity

new smart material developed by researchers at the University of Waterloo is activated by both heat and electricity, making it the first ever to respond to two different stimuli.

The unique design paves the way for a wide variety of potential applications, including clothing that warms up while you walk from the car to the office in winter and vehicle bumpers that return to their original shape after a collision. Inexpensively made with polymer nano-composite fibers from recycled plastic, the programmable fabric can change its colour and shape when stimuli are applied.

"As a wearable material alone, it has almost infinite potential in AI, robotics and virtual reality games and experiences," said Dr. Milad Kamkar, a chemical engineering professor at Waterloo. "Imagine feeling warmth or a physical trigger eliciting a more in-depth adventure in the virtual world." The novel fabric design is a product of the happy union of soft and hard materials, featuring a combination of highly engineered polymer composites and stainless steel in a woven structure. Researchers created a device similar to a traditional loom to weave the smart fabric. The resulting process is extremely versatile, enabling design freedom and macro-scale control of the fabric's properties.

The fabric can also be activated by a lower voltage of electricity than previous systems, making it more energy-efficient and cost-effective. In addition, lower voltage allows integration into smaller, more portable devices, making it suitable for use in biomedical devices and environment sensors.

"The idea of these intelligent materials was first bred and born from biomimicry science," said Kamkar, director of the Multi-scale Materials Design (MMD) Centre at Waterloo.



"Through the ability to sense and react to environmental stimuli such as temperature, this is proof of concept that our new material can interact with the environment to monitor ecosystems without damaging them."

The next step for researchers is to improve the fabric's shape-memory performance for applications in the field of robotics. The aim is to construct a robot that can effectively carry and transfer weight to complete tasks.

A paper on the research, Multi-Stimuli Dually-Responsive Intelligent Woven Structures with Local Programmability for Biomimetic Applications, appears in the journal Nano-Micro Small. MEDIA CONTACT Ryon Jones | @uwaterloonews | uwaterloo.ca/news

# Sydney researchers discover hidden structure in networks like "X"

"New findings could help explain how social media content appears in our feeds / December 2023"

Research published in the latest issue of the journal PNAS Nexus introduces a new method capable of identifying and classifying relationships in networks. They found unexplored types of relationships in almost all of the 53 networks they analyzed.

The study represents a significant advance in understanding complex networks and their scaffolding, while the methodology has the potential to change the way networks are analyzed and interpreted.

The research was led by PhD student Cathy Liu and co-authored by Professor Eduardo Goldani Altmann, both from the School of Mathematics and Statistics, and Associate Professor Tristram Alexander from the School of Physics. All three are members of the Centre for Complex Systems.

One new relationship that the researchers call a "source-basin" structure plays an important role in two online networks the team closely examined – a new network of Twitter users and a well-studied network of political blogs.

"This structure organizes the flow of information in online social networks, which happens from a community of sparsely connected influential nodes – the source – to a community of densely inter-connected active nodes – the basin," Professor Altmann said.

"An example of source-basin organisation would be 'influencers', such as news agencies, acting as the source with regular users performing the role of the basin.



A visual replication of network structures. Assortative (A) and core-periphery (B) depict two of the common relationship structures found in networks, while source-basin (C) portrays the newly found flow of information from less-connected influencers to highly connected users. [Credit: Liu et al.]

"The influencers compete with each other and therefore don't engage one another, while regular users are engaged by the influencers and also connected to each other, such as through retweeting."

Associate Professor Alexander said it is helpful to think of a network like a city with different neighborhoods, each with its own distinct character and social dynamics. The researchers' method allowed them to identify and classify all possible relationships between these neighborhoods, from close-knit communities to more diffuse and diverse networks.



A social media platform like Twitter or a network of blogs are considered complex networks because they involve many interconnected nodes (such as users or accounts) and relationships (like connections, interactions or links) between these nodes.

"Networks are a powerful mathematical representation of various datasets and systems. An important computational tool to study and extract information from large complex networks is to partition it into groups of nodes with similar connectivity," lead author Ms Liu said.

"The surprising finding for the blog network suggests that the source blogs, being heavily referenced, are not tightly connected with each other while receiver blogs are less referenced but highly active in referencing others and strongly connected with each other.

"Our research presents a new way of studying network organisation and, at this stage, we can only speculate on the why and what their effects are on social media, but our plan for the future is to go deeper into this question."

To read the complete study, click here.



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## The Airline Pilot Shortage Continues

### By Wayne Carley

We covered this topic a few years ago, but the numbers are not improving as quickly as hoped to meet the demands of our airline industry. Airlines were struggling to hire pilots fast enough before the pandemic. With the mandatory retirement age of 65 for commercial airline pilots in the U.S., plus the early retirement decisions made due to pandemic woes, the pipeline of new pilots to fill those positions is just not there; thus a nationwide shortage for many airlines looms very near.

Baby Boomers are turning 65 in the early 2020's and being forced to retire in huge numbers. It's happening to most industries and the airlines are no exception. In recent years, many U.S. airlines were offering pilots generous early retirement packages, as they attempted to stretch their payroll as far as possible without layoffs. Suddenly, the pandemic added to the quick and drastic reduction in pilots because of Covid isolation and travel restrictions.

It's only recently that air travel demand has come roaring back, particularly in the domestic leisure market as vaccinated Americans and eased Covid restrictions pave the way for vacationers and those need to get away from it all. TSA checkpoints at airports have averaged 75% of 2019 levels already and we are recover ing from our holiday peak season.

Interestingly, the pilot pipeline coming from the military has been affected with more pilots opting to stay in amid pandemic-era uncertainty, but the military is still struggling to fill its own pilot needs as commercial airlines begin hiring once more.

The Air Force saw a net gain of about 200 pilots in its workforce in fiscal 2020, a small move in the right direction for its continued pilot shortage. The service now has around 19,100 pilots, or 1,900 airmen short of the 21,000 pilots it needs in its ranks. More than 90 percent of pilot positions are currently filled. That means the civilian airline industry needs to recruit lots of new pilots even before making any allowances for previously natural military transition growth.

A 2017 report by analysts estimated

that mandatory pilot retirements at the top five U.S. airlines combined would surge from 1,266 in 2017 to 2,397 by 2021, finally peaking at 2,641 in 2025. Including other airlines, U.S. mandatory pilot retirements could exceed 3,000 annually in the mid-2020s. Moreover, the pace of retirements will remain elevated into the 2030s. Airlines stopped recruiting new pilots during the pandemic, and the industry's deep downturn last year may have scared away some aspiring pilots, thinning out the pipeline of future pilots to meet this need.

As a result, there could be a shortage of more than 12,000 commercial airline pilots in North America by 2023. For those new graduates and pending school graduates interested in a flight career, this is an amazing opportunity in both the military and especially civilian airline industry. That being said, it's time to get started.

### **Pilot Requirements**

The first airline pilot requirement is a pilot degree, such as a bachelor's degree in aircraft operations, aviation, aeronautical engineering, or a related field. The next part of your pilot school requirements is to complete up to two months of ground training, and you will need more than 1,500 hours of flight experience, along with 50 hours flying a multi-engine airplane.



You will need to be at least 23 years of age and some of the skills you'll need for this career include strong communications, problem solving and observation skills, good depth perception and reaction time, and the ability to operate aircraft computer and navigation systems. Finally, you'll be required to have a commercial pilot's license and may need instrument rating certification or airline transport pilot certification. If you started today, it would take you a good 4 plus years, pushing you into 2025 to qualify with little or no experience.

That's the concern of the aviation industry. Replacing all of these retiring pilots won't be easy and the U.S. military is training far fewer pilots than it did a few decades ago. Becoming a airline pilot is an investment and takes time, but as a career choice, the value and need cannot be ignored. Like other professions, pilot salaries are not equal across the board.

Salaries vary annually among airlines and are reflected in the type of aircraft flown, and even flying routes. Salaries also depend on various factors, such as pilot credentials, experience, job title, and pilot union agreements. Also, most people don't realize that pilots are paid by the hour and not an annual salary.



For instance, Southwest Airlines pilots earn an average annual salary of \$222,000, but can earn as much as \$549,000. United Airlines pilots earn an average of 205,000. The average Delta Airlines pilot earns \$192,000 with top-earners making \$526,000. American Airlines pilots earn an average salary of \$118,000, with some pilots earning in excess of \$700,000 per year. In short, the average airline pilot salary for 2020 was \$186,870.

Most importantly, pilot salaries continue to increase. Realistically, it's not about the money, but the love of flight. It's also a huge responsibility with hundreds of passengers under your care. You have to "want it" with passion; a common trait among pilots.

### Step 1: Obtain a Bachelor's Degree

Airline pilots are required to have a bachelor's degree, which can be in any major. However, aspiring pilots can gain more relevant knowledge by enrolling in an aviation or aeronautics bachelor's program. Regardless of major, students must complete coursework in physics, aeronautical engineering, mathematics, and English. It's important to enroll in an aviation or aeronautics program that has been approved by the Federal Aviation Administration (FAA). Being a pilot myself, the course requirements are not as scary as they may sound. Those who truly want to fly will take any course required, and make any sacrifice necessary to get in the cockpit. It is life changing to get those wings.

### Step 2: Acquire Flight Experience

Aspiring airline pilots are required to complete a certain number of hours of flight training to qualify for licensure. To obtain a commercial pilot's license, 250 hours of flight time, in addition to 1,500 hours of flight time for an Airline Transport Pilot (ATP) certificate, is required. Flight training can be completed through degree programs or through flying schools approved by the FAA.

Airline pilots must also have a minimum of 40 hours of instrument flying experience in-air and through simulation. Instrument flying ratings demonstrate a pilot's ability to fly in low visibility conditions that occur almost daily.

Consider finding personal flight instructors. Although formal training provides a basic education, it usually doesn't provide enough experience to easily succeed as an airline pilot. By hiring personal instructors, you have the opportunity to acquire in-depth knowledge.



### Step 3: Obtain Licensure

A minimum number of hours of flight experience must be completed. Individuals are also expected to pass a written exam, demonstrate flying ability, and take an instrument flying rating exam. As a part of the pilot's license stipulations, individuals are required to pass a physical exam, which includes having vision correctable to 20/20, good hearing, and no physical handicaps that could interfere with the job.

### **Step 4: Gain Professional Experience**

Many airline companies require pilots

to take physical, psychological, and aptitude tests, as well as drug tests, as a prerequisite for employment. Once hired, pilots are generally required to undergo an additional 6-8 weeks of training, including at least 25 hours of flight time. Additionally, most new hires are brought on as co-pilots. It's also not uncommon for some pilots to start their career at small commuter or regional airline companies. This gives them the opportunity to gain more flying experience before being hired by a major airline.

### Step 5: Advance as an Airline Pilot

Most advancement in this field is based on seniority, but pilots can reach the rank of captain through other means. Airline pilots can obtain an air transport pilot's license, which shows cross-country, night, and instrument flying experience. This requires passing additional FAA written and practical exams. Pilots may also aim to acquire more flight ratings. Typically, ratings directly correlate to the type of aircraft one can fly, such as a multi-engine jet.

Also, join a professional association. Airline pilots have the ability to continue learning and staying up-to-date with changes in the industry through membership with professional pilot associations. For example, pilots can access aircraft safety training webcasts and webinars offered by the Aircraft Owners and Pilots Association (AOPA) or safety seminars offered by the International Federation of Airline Pilots Associations (IFALPA).

In case you're wondering, Microsoft Flight Simulator does not count toward your experience. But I will add that it's a fabulous tool to gather knowledge about instrumentation, multi-tasking, the physics of flight, communications and aircraft flight operations as well as kindle that interest and passion for flight. I still use the software today to remind me of past voyages through the air, the thrill and challenges of flight dynamics and the joy of just being among the clouds.



Wayne Carley teaching flight at Robins Air Force Base.

I grew up in an Air Force family and discovered the love and passion for flight at a very young age. It's been in my blood since childhood. It's unusual to solo with less than 10 hours of training these days, but in 1984, I soloed after only 4 hours of training. I was scared to death and instantly in love with flight forever.



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