

CAREERS WITH STEM™

MACHINE LEARNING ENGINEER

Insights, information and advice
on the careers of the future

Advance your potential. Make a difference.



Do you like solving problems? Want to create impact on a global scale?



Do something that challenges, drives and rewards you.



At WiseTech Global, we look for enquiring minds who are passionate, tenacious and resilient.



Our students and graduates are encouraged and supported by some of the greatest minds in the technology industry, and given all the tools they need to be successful.



Want to be part of something special?
Find out more at wisetechglobal.com



TECHNOLOGY AS A FORCE FOR GOOD



RICHARD WHITE
CEO AND FOUNDER,
WISETECH GLOBAL

How do the products we buy get to us? If you've never thought about this, you might be surprised at how complex the problem is.

Logistics is one of the oldest industries in the world and worth around A\$16 trillion. And technology lies at the heart of ensuring this global industry operates as smoothly and efficiently as possible.

Moving products around the world is the hugely complex process that the team at WiseTech Global is solving. We're developing an integrated, global technology platform, CargoWise, to meet the diverse needs of the logistics industry.

CargoWise continues to evolve with hundreds of new products and enhancements created by our software engineers, technologists and machine learning experts, across 30 countries, who focus on how we can use technology to simplify and automate that complex process.

We're doing this because we think technology should make a positive impact on the world around us.

Our machine learning experts are using algorithms to take the vast amounts of data in the CargoWise platform and help the world's largest freight-forwarding companies make efficient and productive decisions.

When most people think about machine learning, they think Artificial Intelligence and human-like robots – and yes, this is exciting stuff. But being able to reduce environmental impact by optimising millions of plane journeys, hundreds of millions of container movements and billions of deliveries means making a difference today. Knowing the technology

**IF YOU HAVE A
PASSION FOR SOLVING
PROBLEMS, THEN MACHINE
LEARNING AND TECHNOLOGY
MIGHT BE THE CAREER PATH
FOR YOU ... YOU CAN BE
A FORCE FOR GOOD."**

our machine learning experts are developing helps reduce carbon emissions is something I am very proud of.

These algorithms are also automating repetitive and uninteresting tasks, and enabling people to do the highly skilled work they love and are best at.

If you have a passion for solving problems and discovering innovative ways of doing things, then machine learning and technology might be the career path for you. Remember, technology should be a catalyst for positive change. Not only for you, but on a global scale. You can be a force for good.

Richard White
CEO and Founder, WiseTech Global

**Check out CareerswithSTEM.com
for more insights, information, inspiration and
advice about machine learning engineering careers!**

Machines that learn

Interested in working with (really) smart computers? Discover why machine learning careers are the future

Show me the money

In Australia, machine learning engineers earn between **\$60,000** and **\$138,000** per year*.

You can expect your wages to increase as you progress through your career.

Average pay by years of experience:

1-4 years: \$81,350

5-9 years: \$120,000

*Source: Payscale.com

From the contents of your social media feeds to self-driving cars, machine learning engineers are changing the way we live, work and play.

Machine learning engineers take coding to the next level by creating software that can evolve to do its job better. In traditional programming, instructions are carried to the letter – and exactly the same way each time. But with automation on the rise, there's an increasing demand for software that can learn how to respond more accurately to environments or information without intervention from a programmer – that's called machine learning.

Working within the field of Artificial Intelligence, machine learning engineers design software that can translate and recognise speech, mine large amounts of information, recognise faces, and identify objects in images or videos. To do this, they train systems using relevant data, and give them the ability to gain knowledge from future inputs or situations.

An example of machine learning in action is the content in your social media feed, which is selected based on posts you've liked, shared or marked as offensive. Other examples include self-driving cars that learn how to react to new driving conditions, or Instagram's ability to tag your friends in photos.

If you enjoy finding patterns in data and figuring out how different parts of a system work together, machine learning engineering could be the career for you!

- Nadine Cranenburgh

Machine learning was named **the best job in 2019** (based on growth rate and average salary) by US job site Indeed.

MACHINE LEARNING IS THE NEW BLACK

INSTAGRAM IS USING MACHINE LEARNING TO DEFINE FASHION

In 2017, researchers used machine learning to analyse 100 million photos posted to Instagram to study how clothing styles vary around the world and are changing over time. The study uncovered some pretty fascinating insights, such as that red is becoming less popular over time (who knew?).

More than just uncovering trends in data, machine learning can be a powerful tool for good, too. In late 2018, Instagram announced a new set of anti-cyber bullying features that use machine learning to automatically detect and report bullying in photos posted to the site.



Growing demand

Globally, the demand for machine learning engineers is growing fast. In the US, the number of jobs for machine learning engineers more than tripled between 2015 and 2018.

In Australia, jobs are also booming, with Seek advertising over 1300 machine learning roles in March 2020, spanning the scientific research, tech startup, marketing and sales, health, banking, and energy industries.

MACHINE LEARNING VS AI

While machine learning is one of the cutting-edge technologies which will pave the road to human-like machines, machine learning engineers actually have quite a different job.

The aim of Artificial Intelligence (AI) is to create machines that mimic human behaviour – like Sophia, the robot that was granted Saudi Arabian citizenship in 2017. The software created by machine learning engineers stops short of requesting equal rights with people. Instead, it learns how to make its response to information more accurate by comparing new data to examples from training or previous data, and identifying similarities and differences.

TRUE OR FALSE?

MACHINE LEARNING IS PRETTY COOL SO IT'S NO SURPRISE THAT IT'S A POPULAR TOPIC FOR MOVIES AND BOOKS – BUT IT'S IMPORTANT TO SEPARATE FACT FROM FICTION.

#1 There are no biases

FALSE

Software learns from the training data presented to it by machine learning engineers, which can reflect human biases. For example, Amazon withdrew automated recruiting software which was more likely to select male candidates.

#2 It always makes things easier

FALSE

Accuracy and speed are important, but machine learning software needs to be designed with the application and users in mind. For example, an app to help emergency room doctors find the right specialist to help patients was never used as the doctors were too busy to enter and retrieve data.

#3 The more data the better

FALSE

The saying 'garbage in, garbage out' is applicable to the machine learning field. Relevant, high-quality data and supervision and correction from a skilled human during the training phase leads to much better results than a torrent of garbled information.

#4 It will create more jobs for humans

TRUE

According to a 2018 report from the World Economic Forum, while AI and machine learning will displace 75 million jobs by 2022, they will also create 133 million new roles in that same time period – that means 58 million more jobs in the next few years. So yep, we'll still need humans in the workplace, especially using their human skills like empathy, teamwork, communication and creativity.



SOPHIA.
A HUMANOID ROBOT
CREATED IN 2016

LEARNING ON THE JOB

JAMES BALAJAN TURNED HIS YEAR 10 WORK EXPERIENCE INTO A CASUAL GIG IN WISETECH GLOBAL'S MACHINE LEARNING TEAM STRAIGHT OUT OF HIGH SCHOOL

SOFTWARE DEVELOPER,
WISETECH GLOBAL

BACHELOR OF ENGINEERING (COMPUTER SCIENCE)/
BACHELOR OF COMMERCE, UNSW

YEAR 10 WORK EXPERIENCE,
WISETECH GLOBAL

James Balajan had his first taste of machine learning during Year 10 work experience at WiseTech Global.

"I'd finished my first task, which was creating an XML encoder, and then I was presented with a really difficult problem to classify whether an email address was personal or corporate," he says. "That was the first time I came into contact with data science and machine learning, and I had no idea what I was doing! But you learn as you go, that's the thing about software."

James started learning about software programming at the age of 14 when he picked up his mother's programming textbooks and worked through the exercises. "C++ is my favourite programming language, because it allows you to really delve deep into the low-level internals of computing, which is something I'm interested in," he says.

After doing his Year 10 work experience at WiseTech, James returned the following year for another short-term project. Straight out of high school, James landed an ongoing casual position as a software developer on the machine learning team – and he has just started a double degree in computer science and commerce at the University of NSW.

PORT OF CALL

His current project at WiseTech looks at tracking the movement of ships in and out of ports, and filtering out unhelpful or unnecessary data. The algorithm he is creating is inspired by some of his own personal projects, which he posts on GitHub – an online community where developers can share their open-source code experiments.

What's WiseTech Global?

WiseTech Global is an Aussie tech success story! Founded by UTS graduate Richard White in 1994, it's now a global powerhouse with 60 offices worldwide and more than 2000 employees. WiseTech technology manages logistics for the world's transport – think ships, trucks and planes. Their software platforms help people move products safely, legally and efficiently all around the world.

"One of the best things about being a developer is the constant learning," James says. "The feeling when you finally understand a problem is great."

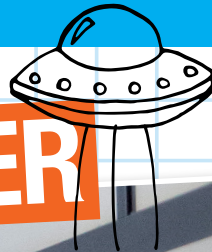
He encourages anyone interested in learning more about software development and machine learning to get on GitHub. "Definitely put all your projects on GitHub," he says. "You may think no one's going to look at them, but people do find them useful. Maybe you will help someone else out."

When he's not studying or working at WiseTech, James likes to read Russian literature and experiment with CPU circuits on his breadboard. In the future, he'd like to one day start his own technology company – that's why he decided to study commerce.

"I've heard too much about very technologically-oriented people like Steve Wozniak getting exploited by people with more business knowledge!" - Chloe Walker

ONE OF THE BEST THINGS ABOUT BEING A DEVELOPER IS THE CONSTANT LEARNING

A day in the life of a... MACHINE LEARNING ENGINEER



We asked WiseTech Global computer scientist **Igor Malin** what his average 9-5 looks like

While working as a software developer at WiseTech, Igor began to see how new technologies like machine learning could help the company get an edge. He completed a Masters degree in data science to update his skills, and now leads a team of 15.

Some of the machine learning projects they work on include streamlining customer service responses using technology that can match language and meaning in different queries, and analysing conditions that affect the delivery of shipping containers to give more accurate arrival times.

"I identify areas where we would apply machine learning and data science and then I develop that idea into a product we can provide to our customers," says Igor.

Looking after his team is Igor's number-one priority. Here's what a typical day looks like:

6:50am

My young son is my alarm. He wakes me up and I get ready to ride my bike to work.

8:30am

The first thing I do is check the progress of different projects the team is working on and see if there is anything stopping them from moving forward. Most of my role is about helping my team achieve their best!

9am

I spend some time exploring the data set we are currently working with. I work with teams across the whole company so I need to understand their data and how it connects with our main system.

10:30am

Once a week I sit down with one of my team members who is completing a degree online and talk about what they've learned and any problems with their homework.

11am

Twice a week the team has a quick stand-up meeting to run through what we're working on and our plans for the next few days.

12:30pm

Lunch time! There is a lot of multicultural food to choose from near our office.

2:30pm

I interview a potential candidate for the team. I like hearing about people's different experiences. Interviews here are more of a conversation to see where someone would fit best.



3:30pm

As well as our team's stand-up, I try to attend other team meetings to let them know what we are working on and find out how we can help them.

5:30pm

Time to head home. In the evening I'll read to my son and then sit up in bed with a sci-fi novel. - *Chloe Walker*

TEAM LEADER.
EPAM SYSTEMS

SENIOR DEVELOPER.
LUXOFT (ALSTOM GRID)

SOFTWARE DEVELOPER.
PROSOFT

MASTERS IN COMPUTER
SCIENCE, NATIONAL AVIATION
UNIVERSITY, KIEV, UKRAINE

DATA SCIENCE TEAM LEADER.
WISETECH GLOBAL

SOFTWARE DEVELOPER/
ARCHITECT, WISETECH GLOBAL

MASTERS IN DATA SCIENCE
AND MACHINE LEARNING
UNIVERSITY OF SYDNEY



Get the job!

Feeling inspired? Find out how to get a career in machine learning engineering – starting now

LISTEN AND LEARN

Three podcasts to keep you inspired and informed about all things Machine Learning

Talking Machines

Described as “human conversations about machine learning”, this podcast is hosted by two machine learning experts who interview other experts and talk about machine learning-related news. thetalkingmachines.com

Concerning AI

“Is there an existential risk to humanity from AI? If so, what do we do about it?” That’s the promo for this podcast – and it might sound scary but the ethics and impacts of smart machines are a fascinating – and vital – topic to explore. concerning.ai

Learning Machines 101

This podcast promises to offer “a gentle introduction to Artificial Intelligence and Machine Learning”, although some of the topics covered are still pretty technical. The podcast series explores questions such as: how do machine learning devices work? Where do they come from? How can we make them even smarter and more human-like?

learningmachines101.com

TALKING
MACHINES



LEARN PEOPLE SKILLS!

Remember: you’ll be working with people as well as machines, so brush up on these skills

Empathy and ethics

The world needs engineers who are concerned about the ethical implications of smart machines and how they might impact society.

Leadership

Whether or not you’re managing a team, leadership skills – such as the ability to take initiative and make decisions in the face of uncertainty – will be extremely useful.

Teamwork

Despite the stereotypes, engineers aren’t hunched over screens alone in a dark room – they usually work in diverse teams!

Communications

You’ll need to communicate your work to different people – not just other engineers. Practice makes perfect, so take every opportunity to read, write and speak publicly.

Time Management

Struggle with deadlines? Time to work on that – start now building solid routines and time management techniques – such as prioritising tasks, setting goals and blocking distractions like phone notifications. Not only will they help you finish your assignments in time, but also in your future career.



Choose this career if you...

- > Love cutting-edge tech
- > Love maths and coding
- > Are creative and work well in teams
- > Like thinking philosophically
- > Are a problem solver at heart
- > Love learning new things

Electives checklist

Choosing high school electives? These subjects will set you on the right path to a career in machine learning engineering

- ✓ Maths
- ✓ Engineering Studies
- ✓ Design and Technology
- ✓ Computing studies