Rachel George

BSc (Hons) Computer Science
University of Birmingham

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Rachel Portfolio Website (rgeorge8.github.io)

SKILLS

- Problem solving
- Teamwork
- Time Management
- Lateral thinking
- Maths dexterity
- Interpersonal Communication

TECHNICAL SKILLS

- Programming skills in Java and Python.
- Experience working with front and back-end web development technologies such as HTML, CSS, JavaScript, and PostgreSQL.
- Proficient in Git and GitHub, with experience in code management, branching, merging, and collaboration through pull requests and code reviews.
- Knowledge of data structures and algorithms; able to analyse time complexities and identify the benefits of using different algorithms and data structures to solve specific problems.
- Proficient in Artificial Intelligence, with experience in solving optimisation problems and applying machine learning algorithms such as K-means clustering, K-nearest neighbours (KNN), gradient descent, linear and logistic regression. Skilled in clustering techniques and conducting both informed and uninformed searches to improve decision-making and model performance.
- Proficient in theories of computation with a solid understanding of computability and complexity theories (including decidability, P vs NP, and complexity classes like NP-hard and NP-complete). Experienced in designing optimised automata and mathematical proofs.

ABOUT ME

Second-year Computer Science student with a strong foundation in programming, algorithms, and software development. Passionate about problem-solving and eager to apply my knowledge in real-world projects. Actively expanding my skills in areas like artificial intelligence, data structures, and designing optimal solutions for problems with a focus on building a career in the tech industry.

EDUCATION

BSc Computer Science (FT) – 2026
University of Birmingham, UK

- 1st Year – First with a grade average of 80%
  - Modules studied: object-oriented programming, data structures and algorithms, mathematical and logical foundations of computer science, artificial intelligence, theories of computation, full-stack application development.

A-levels – 2023
Altrincham Grammar School for Girls Sixth Form, Bowdon, UK

- Physics — A
- Chemistry — A
- Further Maths — B
- Maths — A (achieved in 2022)

GCSEs – 2021
Altrincham Grammar School for Girls, Bowdon, UK

- Biology — Grade 9
- Chemistry — Grade 9
- English Literature — Grade 9
- Geography — Grade 9
- German — Grade 9
- Maths — Grade 9
- Physics — Grade 9
- Computer Science — Grade 8
- English Language — Grade 8

ACHIEVEMENTS

UK Bebras Computational Thinking Challenge
An international competition where complex tasks must be broken down into simpler components to solve problems.

- Certificate of distinction in 2019 and 2022 for being in the top 25%, leading to a personal invitation to the Oxford Computing Challenge in 2020 and 2023
- Best in School and Gold Award in 2021 for being in the top 10% nationally, leading to a personal invitation to the Oxford Computing Challenge in 2022

United Kingdom Mathematics Trust (UKMT)
Annual competitions which encourage mathematical reasoning, precision of thought, and fluency in using mathematical techniques.

- Achieved Silver Certificates in 2017, 2019, 2020 and 2021 for being in the top 20%
- Achieved Bronze Certificates in 2018, 2022 and 2023 for being in the top 40%
- Chosen to represent my school in the 2018 Regional Finals of the UKMT Team Challenge, which focused on Maths dexterity, teamwork and communication. Our team placed 5th out of the 27 regional teams

- **Mathematical Education on Merseyside Challenge (MEM)**
  Complex set of mathematical word problems which require an ability to think logically to solve.
  - Achieved Third Prize, Best in Year and Best in School Awards in 2017, 2018 and 2020
  - Achieved Certificate of Merit, Best in Year and Best in School Awards in 2019
- **Mathematics Masterclasses by the University of Liverpool**
  - Attended weekly masterclasses held by the University of Liverpool after placing 3rd in the MEM Challenge
- **International Atomic Energy Agency (IAEA) Student Video Competition 2022**
  - Global winner from 301 entries from 34 countries
  - Taught myself to use Adobe Premiere Rush and was in charge of video editing
- **Bronze Certificate in the Chemistry Olympiad in 2022**
- **Silver Certificate in British Physics Olympiad (BPHO) in 2021**
- **National Citizen Service (NCS) (August 2021)**
  - Met new people and adapted to work with them efficiently, improving my teamwork and leadership skills.
  - Communicated with organisations to collect donations by utilising my skills in public speaking and communication
- **Competed in the Alan Turing Cryptography Competition in 2019 to 2020, held by the University of Manchester**

WORK EXPERIENCE

Tesco Colleague – (December 2021 & July 2023 – September 2023 & December 2023)
Efficiently operated the tills and self-scan, ensuring the accurate management of cash and card payments. Worked on shop floor to rotate stock.

- Thrived in a high pressure, fast paced retail environment.
- Learnt how to quickly adapt to surroundings and be flexible.

Arup Design Programme – (July 2022)
Designed a nature park to meet a specific project brief.

- Refined public speaking skills by pitching our idea to a panel of industry experts.
- Learnt about collaboration and delegation by working as part of a team.

White Rose Physics Virtual work experience – (July 2022)
Listened to experts give lectures on Goldilocks Zones and conducted further research to produce an informative poster detailing how habitable planets are found.

- Utilised public speaking skills to present my poster to a group of people.
- Improved Microsoft Excel skills by inputting data to plot graphs, and Microsoft Word skills by designing poster to be both aesthetic and informative.

Tutoring – (July 2021 – August 2021)
Tutored in maths, comprehension, spelling and non-verbal reasoning.

- Improved communication, organisational skills, and leadership skills by creating lesson plans personalised to the student to help build upon strengths and build confidence.

British Heart Foundation Volunteer – (November 2021- December 2021)
Volunteered on the tills and on the shop floor to enhance the displays and rotate stock.

- Provided excellent customer service whilst interacting with people of all ages.

PROGRAMMING EXPERIENCE

HTML, CSS, and JavaScript

- In the summer after my first year at university, I created a portfolio website.

Python

- Wrote a program to simulate a two-player dice game.
- Developed a deep learning model for recognising facial expressions from images using a Convolutional Neural Network (CNN). Leveraged a Kaggle dataset containing 48x48 pixel grayscale facial images. Implemented the project using Python, with libraries including TensorFlow, Keras, Pandas, NumPy, Matplotlib, and Scikit-learn.

PostgreSQL

- Used PostgreSQL to develop robust, scalable, and secure databases, ensuring efficient data management and retrieval.
- Created tables using data from CSV files and queried them too.

WEKA

- Efficiently handled complex datasets, performed comprehensive analysis, and visualised findings to support data-driven decision-making.

Java

- Created a news classifier that categorised news articles based on their content.
  - Cleaned, lemmatized, and removed stop words from document text as part of NLP.
  - Used TF-IDF (Term Frequency-Inverse Document Frequency Embedding), where text documents are converted into vector representations such that each document is represented as a vector in a multidimensional space.
  - Calculated the cosine similarity between two articles to measure their semantic closeness and grouped them based on this.
- Created an advanced news classifier using GloVe Embedding and ML
  - Used BufferedReader to read the glove file line by line and added different parts of the document to different lists, e.g. its vector representation to a list called listVectors.
  - Created arrays using ND4J to store the embeddings of words.
  - Implemented inheritance and polymorphism.
- Developed a 3-tier TCP-based networking multi-threaded client-server application to consult a database about vinyl records.
  - The application features a client that offers a JavaFX based graphical user interface to request the service and communicate with an intermediate server providing a query specific service.
  - The server, located in the local host, consists of two classes; one being the main server which attends requests as they arrive on an infinite loop, and the server's service provider that is created to attend each service.
  - It is the server's service provider which connects to the database using JDBC, retrieves the outcome of the query, and sends back the outcome to the client.