

# The State of the Art in Computer Hardware

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## 1 Abstract

Over the past few decades, advances in computer hardware have revolutionized the way we live and work. From the first electronic computers to the modern day supercomputers, the capabilities of computer hardware have continued to expand and evolve.

One area of current research and development in computer hardware is optical computing. Optical computing uses light as a medium for processing and storing data, rather than electricity. This approach has the potential to significantly increase the speed and efficiency of computing, as light can travel much faster than electricity. Some recent examples of impactful work in this area include the development of a photonic chip for use in data centers [Liu et al., 2020], and the demonstration of a scalable optical computer using silicon-based photonic circuits [Wang et al., 2021].

Another exciting area of research in computer hardware is quantum computing. Quantum computers use the principles of quantum mechanics to perform calculations that are exponentially faster than those of classical computers. While still in the early stages of development, quantum computers have the potential to solve complex problems that are currently beyond the capabilities of classical computers, such as breaking modern encryption algorithms and simulating complex chemical reactions. Some recent examples of impactful work in this area include the development of a quantum computer with error rates low enough to perform useful calculations [Zhong et al., 2020], and the demonstration of a quantum computer that can perform calculations exponentially faster than a classical computer [Arute et al., 2019].

In conclusion, the state of the art in computer hardware is constantly evolving, with exciting developments in areas such as optical and quantum computing. These advances have the potential to significantly impact the way we live

and work, and will continue to drive innovation in the field for years to come.

## 2 Method

This document was generated by interfacing with <https://help.openai.com/en/articles/6825453-chatgpt-release-notes> on 27 December 2022. The author, Justin Fritz of The Canonical Art LLC entered the requests compiled the responses presented in the source code. The QR code, demotion of the auto generated content to the "abstract" section, the Methods and Source Code sections were authored by Justin Fritz.

## 3 Source Code and Tool Output

Request:

Write a short article in latex about the state of the art in computer hardware including optical and quantum computing, provide citations to recent, relevant and impactful work.

Response:

*See Abstract.*

Request:

provide the bibliography in a format that the previous output can reference.

Response:

*See Bibliography.*

Request:

what do I need to do to compile the previous two responses on my Mac book pro with texmaker

Response:

To compile the previous two responses on your Macbook Pro with Texmaker, follow these steps:

Install a LaTeX distribution on your Macbook Pro. There are several options available, such as TeX Live, MacTeX, and MiKTeX. These distributions include all the necessary tools and packages to create and compile LaTeX documents.

Download and install Texmaker on your Macbook Pro. Texmaker is a popular LaTeX editor that provides a user-friendly interface for creating and compiling LaTeX documents.

Open Texmaker and create a new document by going to "File > New".

Copy and paste the code for the outline of the play and the bibliography into the new document.

Save the document by going to "File > Save As". Choose a name for the document and select a location to save it.

To compile the document, go to "Tools > Quick Build". Texmaker will automatically compile the document and display the output in the viewer.

If you need to make any changes to the document, you can edit the code in Texmaker and then recompile the document by going to "Tools > Quick Build" again.

Note: If you encounter any errors during the compilation process, check the log file for information on what went wrong and try to fix the errors. You can access the log file by going to "View > Output > Log".

## About the Author



Justin A. Fritz is a versatile hardware and systems engineer with experience in program development and management. He has recent FPGA/ASIC design experience with expertise in high performance architecture for convolutional/deep neural networks (DNN/CNN), wireless communications, DSP algorithm development and digital hardware implementation. He has worked for companies such as Microsoft, Xilinx, Freescale Semiconductor, InView Technology, and Applied Research Laboratories. Justin holds a M.S. in Electrical Engineering from Rice University and is the CEO of The Canonical Art LLC, a company specializing in tools to instrument, model, understand and interact with one's business and process.

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## References

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