

Podcast Title: ACM Bytecast

Episode Title: John Hennessy & Dave Patterson

In this, the first episode of ACM Bytecast, Rashmi welcomes Dave Patterson and John Hennessy to the show to talk about their experience in the field of computer architecture. John is the former president of [Stanford University](#) where he still teaches and works with scholarship programs and he is also the chair of the Board of Directors of a startup called [Alphabet, Inc.](#) Dave currently works at Google after his 40-year tenure as a professor at [Berkeley](#). Dave and John describe their 'aha moment' that took place when Dave wrote an oped entitled [The Case for Reduced Instruction Set Computers](#) in 1980. They learned that it would be more efficient to make micro instructions the instruction set rather than add an extra level of interpretation. The two unpack the ways that efficiency in computer science has changed over time. When they first began working together there were far less transistors, so they had to learn how to efficiently use those transistors. Today, power is what has to be used efficiently. John predicts, however, that due to [Moore's Law](#), that transistors will need to be used efficiently again in the future.

Rashmi then brings up the topic of memory architecture. Dave walks through the changes of memory throughout the years that have led to the semiconductor memory of today and the newer memory technology, called [DRAM](#). There is a lot of innovative work coming from companies like Google, Facebook, Amazon, etc., but he predicts that it would be possible for a smaller, startup company to play a role as well if they had the right technology. He believes that there are opportunities for new companies around hardware. From here, the conversation shifts to some of the discussions Dave has been having centered around hardware-enabled AI. He predicts that young computer scientists in the same stage as he and John when they worked on reduced instruction set computers to start inventing brand new fields of how to build hardware that can execute machine learning well.

The group then begins to talk about what is currently happening in the world of security. Dave believes that one of the great downfalls in the world of computer science is the progress that has been made in the realm of security. He believes that it is time for the security community to stop being critical of others hardware and software and begin to start making strides and work in synthesis with these companies. John believes that it is time for better security that is still able to make it easy to have a secure system in place. Dave hopes that some of the strides that have been made in the realm of [open source](#) software can be replicated in the hardware security industry. As the field of computer science continues to move, John is hopeful for up-and-comers in the industry who have unlimited resources at their fingertips by being able to attend and learn through online courses. Dave heavily emphasizes leveraging these resources to stay on the leading edge of an industry that won't wait for people to catch up on the latest trends and technologies. While these courses are primarily geared towards software development, there are several courses in hardware, security and machine learning. To close, Dave and John talk about how they began working together and gave advice on how to create a great partnership in this competitive industry.

Key Takeaways:

0:58 - Dave and John introduce themselves and speak to what they currently do and give insight into what drew them into this field of work

2:32 - Dave and John talk about the early moments of their careers that they see as 'aha' or breakthrough moments.

4:52 - Dave unpacks his thoughts about the measurement of [performance per watt](#).

6: 57 - The group discusses the current state of memory architecture and where that technology is heading.

10:03 - John explains where new innovation is coming from in the realm of research and investment in memory technology.

12:25 - Dave unpacks some of the discussion that he has been having that is centered around hardware-enabled AI.

14:59 - The group discusses what is currently happening in the world of security when it comes to computer science technology

18:20 - Dave talks about how [open source](#) software has become more mainstream in the recent years, making it much easier to collaborate.

21:50 - The two give advice for practitioners who are trying to stay abreast of the latest changes in their industry.

25:15 - Dave and John share about their partnership and give advice on how to build and maintain a successful partnership in this industry.

Links:

Learn more about ACM: <https://www.acm.org/hennessy-patterson-turing-lecture>

Purchase Dave and John's book: [Computer Architecture: A Quantitative Approach](#)

Purchase John's book: [Leading Matters](#)

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