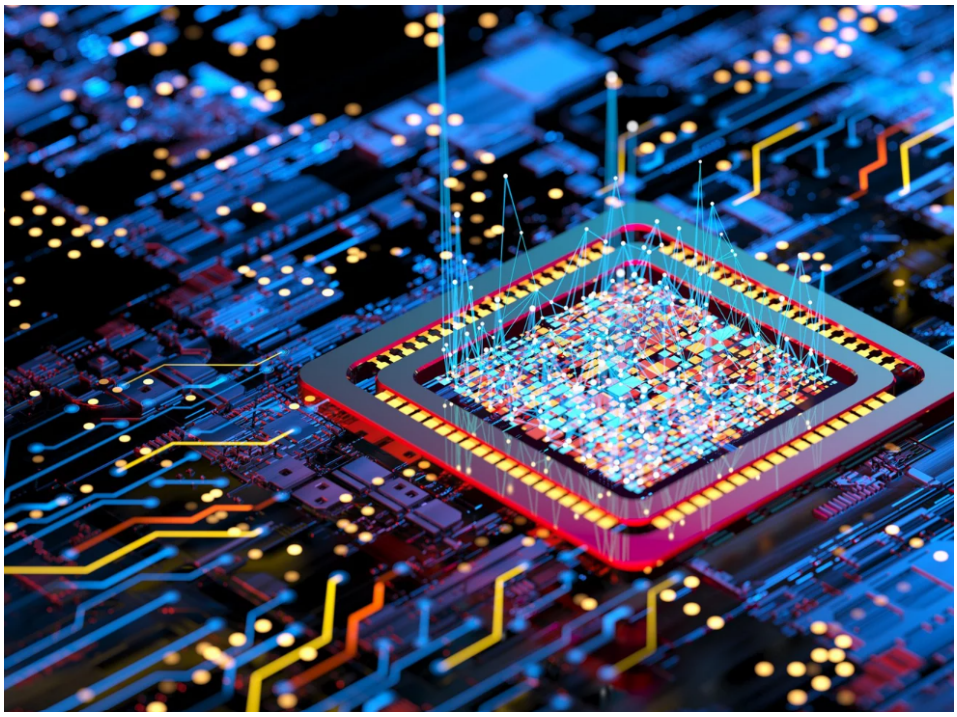
Knights Model United Nations Invitational Conference

United Nations Commission on Science and Technology for Development (CTSD): The Microchip Future



December 3, 2022

Letter From the Chair

Hello, delegates! My name is Ashir Kashyap and I am a senior at the Bishop's School. I will be your chair for this year's Commission on Science and Technology for Development (CTSD) Microchip Committee. I have been part of MUN since 9th grade and really enjoy discussing current events and forming creative solutions! I love participating in conferences, so I am excited to help you all have an amazing experience at this KnightsMUN!

Microchips have long been an important issue facing the United Nations and the world. However, in recent years, this issue has become especially prominent given that microchip technology is advancing at unprecedented rates, regulation on production and distribution is limited, and geopolitical tensions are on the rise. Now seen in virtually all appliances, cars, phones, and medical equipment, microchips are becoming increasingly powerful and widespread. As the role and use of microchips have expanded beyond their original purpose to create sleeker, smaller designs, it is vital, now more than ever, to consider the potential ramifications of the production, access, and distribution of microchip technology. Good luck delegates and I look forward to seeing how each of you "chip in"!

If you have any questions, please feel free to email me at ashir.kashyap.23@bishops.com.

I. Background

Microchips are defined as "rectangular chips or tiles of a crystalline semiconductor, usually silicon, that have been layered with large numbers of microscopic transistors and other electronic devices."[1] Essentially, these small devices house a number of complex technological systems, enabling users to complete complex tasks with a very "micro" amount of electronics.

Prior to the use of microchips, people relied on vacuum tubes, which were "hollow glass bulb[s], approximately cylindrical in shape," to run their electronics.[2] Invented in 1907, vacuum tubes were bulky, expensive, and unreliable; subsequently, in the 1930s, scientists concluded that a smaller alternative could be invented in order to minimize cost and breakdown. In 1947, American scientists created the transistor, which worked the same as the vacuum tube but eliminated many of its disadvantages. Despite this, the transistor still proved to be a bit large and fragile. In 1958, the microchip was invented; it was even smaller, more reliable, and cost-efficient.[3]

Initially, microchips were utilized in missile and rocket launches, for which the US government needed to create lightweight computers and technology. In present day, however, the microchip industry has expanded and encompasses everything from cars to smartphones to medical equipment. Microchips "enable applications such as virtual reality and on-device artificial intelligence (AI) as well as gains in data transfer such as 5G connectivity, and they're

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[1] "Computer Science: Microchip Technology," encyclopedia.com, accessed November 10, 2022, https://www.encyclopedia.com/science/science-magazines/computer-science-microchip-technology.
[2] "Vacuum Tube," encyclopedia.com, accessed November 10, 2022, https://www.encyclopedia.com/science-and-technology/computers-and-electrical-engineering/electrical-engineering/vacuum-tube.
[3] "Computer Science," encyclopedia.com.

also behind algorithms such as those used in deep learning."[4] Clearly, today's technology-based world relies heavily on these sorts of applications, and subsequently, we rely a lot on microchips.

Yet, as with other items, high-demand resources such as microchips can also increase tension between nations. For instance, microchips play a large role in the accordingly named "Chip War" between China and the US. Around thirty percent of American semiconductor revenue is from Chinese exports; in 2021, the Chinese imported around 400 billion dollars worth of microchips. However, China's new policy is that "self-reliance has become a national imperative."[5] This means that the US semiconductor business may drop, not only because China will stop their American imports, but also because China has been working on their own microchip industry. One Chinese business, Semiconductor Manufacturing International Corporation, began to ship seven-nanometer chips in spite of American sanctions.

Finally, it is also important to keep in mind the effects that microchip regulation can have on international issues that, on the surface, seem unrelated to microchips. For example, the US recently announced a variety of sanctions on the Russian government in response to the Russia-Ukraine War, including microchips like semiconductors. These restrictions were implemented with the hopes of cutting off the Russian economy and technology sector, "impact[ing] their ability to compete in the 21st century economy," as President Joe Biden stated in a press conference earlier this year.[6]

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[4] "The basics of microchips," ASML, accessed November 10, 2022, https://www.asml.com/en/technology/all-about-microchips/microchip-basics#:~:text=What%20are%20microchips%20used%20for,consoles%2C%20cars%20and%20medical%20equipment.

[5] Keyu Jin, "How China Is Fighting the Chip War With America," The New York Times, October 27, 2022, accessed November 10, 2022, https://www.nytimes.com/2022/10/27/opinion/china-america-chip-tech-war.html?searchResultPosition=3.

[6] Max A. Cherney and Hirsh Chitkara, "Four things to consider as the U.S. imposes chip sanctions on Russia," Protocol, accessed November 10, 2022, https://www.protocol.com/enterprise/russia-ukraine-chip-sanctions.

II. UN Actions

The UN has made several announcements pertaining to the treatment of new technology, including microchips. In 2018, the UN released the *UN Secretary-General's Strategy On New Technologies*, which introduces several principles and commitments that they hope to follow when addressing developing technology. Notably, they hope to "provide a platform for governments, businesses and civil society across generations to make collective choices about new technologies."[7] This is one potential means of instigating collaboration of international institutions regarding microchip technology.

Despite its potentially destructive capabilities, microchip technology—if used properly—has the power to save millions of lives around the world by helping achieve the Sustainable Developments Goals. One example of its profound impact can be seen through the use of microchips in medical equipment. One of the primary causes of death for Americans is diabetes, killing "69,071 Americans every year." Microchip technology has the potential to save "the lives of hundreds of thousands of people" through its innovative approach to treating diabetes. This technology will virtually erase all error in treatment resulting from "methods of insulin therapy when patients give themselves the wrong dosage or forget to test their blood."[8] The development of microchip treatment for diabetes is life-changing technology that has the potential to essentially replace the need for shots or injections; this is just one example of the power of microchip technology to change the world for the better.

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[7] United Nations, "Secretary-General's Strategy on New Technologies," United Nations, last modified 2018, accessed November 10, 2022, https://www.un.org/en/newtechnologies/.
[8] Eltorai, Adam E M, et al. "Microchips in Medicine: Current and Future Applications." *BioMed Research International*, Hindawi Publishing Corporation, 2016, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4914739/.

III. Questions to Consider

There are many different ideas about how to regulate distribution and access to technology. A potential regulation may include withholding these technologies from countries if they use them to endanger people's lives. This is a complicated issue, so I hope that many different solutions are considered. Some questions that will be important or could help guide your plans are:

1. What solutions would be the most efficient and realistic? How or what will ensure that countries abide by these solutions?
2. To what extent should (or can) the United Nations play a role in regulating the technology of private companies?
3. What are the ways in which microchips can be used to help promote and advance the Sustainable Development Goals?
4. Should the United Nations restrict access to microchips in the event of a global threat? If so, what constitutes a "global threat"?

IV. Helpful Resources

- https://www.unglobalcompact.org/what-is-gc/participants/19153
- https://www.whitehouse.gov/briefing-room/presidential-actions/2022/08/25/executive-order-on-the-implementation-of-the-chips-act-of-2022/
- https://research.un.org/en/innovation
- https://www.asml.com/en/technology/all-about-microchips/microchip-basics#:~:text=It's%20hard%20to%20imagine%20a,Microchips%20are%20everywhere.
- https://www.encyclopedia.com/science/science-magazines/computer-science-microchip-technology
- https://www.tsmc.com/english

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"The basics of microchips." ASML. Accessed November 10, 2022. https://www.asml.com/en/technology/all-about-microchips/microchip-basics#:~:text=What%20are%20microchips%20used%20for,consoles%2C%20cars%20and%20medical%20equipment.

United Nations. "Secretary-General's Strategy on New Technologies." United Nations. Last modified 2018. Accessed November 10, 2022. https://www.un.org/en/newtechnologies/.

"Vacuum Tube." encyclopedia.com. Accessed November 10, 2022. https://www.encyclopedia.com/science-and-technology/computers-and-electrical-engineering/electrical-engineering/vacuum-tube.