

Optimizing Semiconductor Product Development: Chetan Arvind Patil on Yield, Testing, and Industry Impact

By Parul, Correspondent | Friday, 14 June 2024, 08:44 Hrs
 [\(https://www.instagram.com/siliconindia_india_edition/\)](https://www.instagram.com/siliconindia_india_edition/)



The semiconductor industry will continue to revolutionize current and future technology in the mobile devices, automotive, and industrial front, among others, where Chetan Arvind Patil (Senior Product Engineer at NXP USA Inc.) plays a critical role. In the interview series with Silicon India, Patil discusses the concepts of product test engineering, costing, and the process of creating new semiconductor products and technologies in detail. In this particular interview, he stresses that he seldom gets a small role in the show and defines what skills are crucial in his work. You can also know more about semiconductors and the latest trends in semiconductor industries from our previous interview articles on Silicon India!

Experience In Product Test Engineering and New Semiconductor Product/Technology Introduction (NPI/NTI)

Q1: You work as a Product Engineer at NXP USA Inc., briefly share about this work and how it correlates to silicon design and manufacturing.

Patil: In NXP USA Inc. as a Product Engineer my responsibilities include introduction of new semiconductor products and technologies by focusing on design, yield, characterization, compliance, quality, reliability, testing, manufacturing as well as assembly. This work is directly relevant to silicon design and manufacturing since it makes certain that each developmental phase including design, development, and integration to manufacturing is optimally efficient and dependable.

Challenges In NPI/NTI

Q2: How is your work critical in the development of a New Semiconductor Product/Technology Introduction (NPI/NTI)?

Patil: The NPI/NTI work is considered to be important because my work requires characterization to the production of new semiconductor products and technologies to meet all the specifications and performance standards to ensure they are up to standard for use. On top, all the products developed using NPI/NTI methodology enable millions of different types of consumer centric end products. By defining yield, quality, and reliability up-front in a product's development, it enables the early detection of possible hitches that may arise during the product development cycle thus minimizing disruptions during the product launch and consequently having shorter time to market. This rigorous method aids in bringing quality and innovation, aspects deemed critical for addressing the industry's dynamic needs.

Connection Of Testing, Yielding & COGS

Q3: How are yield, testing, and Cost Of Goods Sold (COGS) related?

Patil: Yield, testing, and COGS are intertwined and can be affected by each other in a semiconductor business. Yield can be defined as the number of good chips obtained from a silicon wafer. It will produce even more functional chips to lower the cost per each chip and as a result, lower the COGS. Stringent quality assurance measures make sure that only high-quality chips are produced and used hence a high yield is achieved in production. To be able to constantly offer competitive prices and make good profits, it is critical to manage the element of COGS, mostly through increasing yields and testing. More so on the testing side, where the test time can positively impact when every die is tested quickly without any spec escapes. Any increase in test time negatively influences the COGS, as the overall cost of testing increases.

COGS In Product Business

Q4: How does this impact the product business?

Patil: These are the yield, test, and cost of goods sold which are influential to the product business. The increase in yield, lower testing time, and reduction of COGS provide the benefits of giving competitive prices, especially in the semiconductor industry which has much competition. Good testing also underlines the effectiveness of products and the quality of products to the extent of customer acquisition and customer loyalty. All these factors contribute to the company's profit-making, sales, and sustainable business. Unless better yield meets a target (or better than the target) test time, the product business is not viable and thus the silicon product development team spends a lot of time on these two aspects during the NPI/NTI stages.

Q5: How does yield impact a silicon node, and why are both new and old FABs focused on it?

Patil: Yield is an important parameter to consider with silicon nodes since it is directly linked to the cost of semiconductor manufacturing and the time taken. High yields result in more functional chips per wafer, which is crucial now that it is getting difficult to produce wafers at a cheaper cost as the nodes shrink. It can be seen in the cases of new FABs as well as in inherited ones that yield optimization is a primary concern to reduce the cost and remain viable. Yield enhancement is critical since any business person wants their product to be self-sustaining and not end up in huge losses.

Essential Skills Of Product Engineer

Q6: What skills are needed to be a product engineer and also a test engineer if one wishes to pursue these careers?

Patil: To be a successful product engineer, one needs a strong foundation in semiconductor physics, circuit design, and materials science. Skills in data analysis, understanding yield impact technical concepts like wafer excursion, etc., know-how of NPI/NTI development cycle, strong hold on reliability strategy, problem-solving, and project management are also essential. For a test engineer, a deep understanding of testing methodologies, statistical analysis, and failure analysis is crucial. Both roles require a keen attention to detail, the ability to work collaboratively in a team environment, and a continuous drive to learn and adapt to new technologies and methodologies.

Patil: Specifically, general background education in semiconductor physics, circuit design, and material science in consideration of what it takes to be a good product engineer. Skills in data analysis, problem-solving, and project management are also vital when working with ASR systems. From the above-discussed qualities of software testing, a test engineer should have documentation, testing methodologies, statistical tools, and failure analysis. During the implementation of projects, both positions involve accurate attention to detail working in a team, and learning about new technologies and methods continuously.

About Chetan Arvind Patil

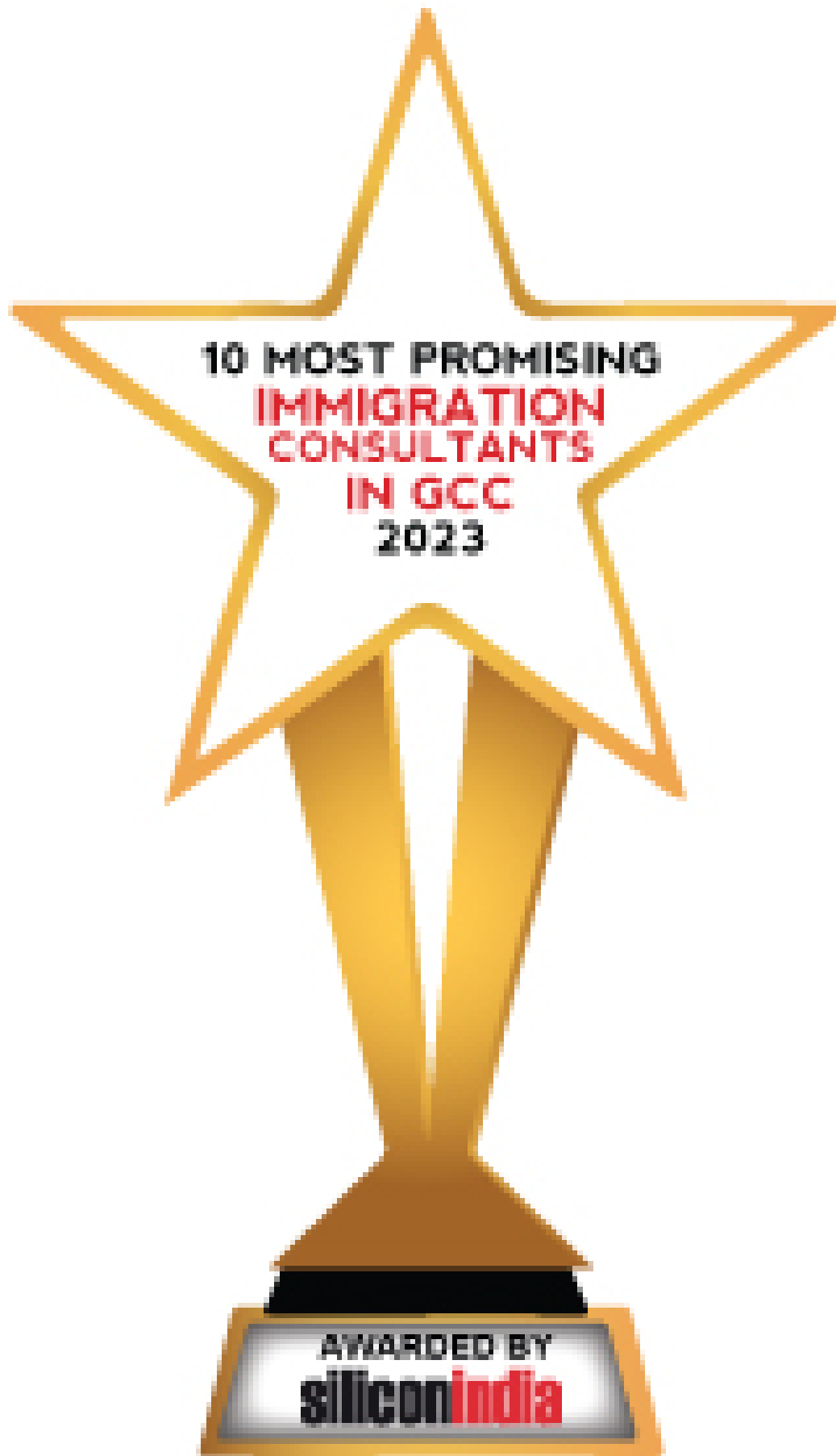
Chetan Arvind Patil is currently a Senior Product Engineer at NXP USA Inc. and has a proven track record of developing silicon devices used in mobiles, industries & automobiles by leveraging his NPI/NTI skills. Connect with him on his **website** (<https://www.chetanpatil.in/>) and **LinkedIn** (<https://www.linkedin.com/in/chetanarvindpatil>).

ON THE DECK



(<https://www.siliconindia.com/magazine/us/november-2023-issue.html>)

The Future Of The Workforce: Investing In... (<https://www.siliconindia.com/magazine/us/november-2023-issue.html>)



([https://www.siliconindia.com/ranking/us/Top 10 Immigration Consultants in GCC - 2023-rid-242.html](https://www.siliconindia.com/ranking/us/Top-10-Immigration-Consultants-in-GCC-2023-rid-242.html))

© 2024 siliconindia.com All rights reserved. **Privacy Policy** (<https://www.siliconindia.com/privacy-policy/>)