



### **Technical Talk on Special Gas Distribution for Semiconductor Industry**

By By Dr. Leow Cheah Wei

Electronic Engineering Technical Division Committee Member

On 29 June 24, Electronic Engineering Technical Division (eETD) IEM hosted a technical talk on special gas distribution in the semiconductor industry. Dr. Chin Hon Keong, an esteemed expert in semiconductor manufacturing processes, delivered an enlightening presentation attended by 13 professionals from diverse engineering disciplines. The focus of the talk was to explore the intricate systems and technologies involved in the safe and efficient delivery of these essential gases in semiconductor fabs and their impact on operational efficiency and product quality.

Dr. Chin commenced the talk with an overview of semiconductor manufacturing, emphasizing the categorization of TFCI, characteristic of the special gases, material compatible and UHP required in cleanroom environments. He highlighted the role of gases such as nitrogen, hydrogen, argon, and specialty gas mixtures e.g. forming gas (4% H<sub>2</sub>/N<sub>2</sub> etc) in various fabrication processes, from deposition and etching to cleaning and purging.

The core of Dr. Chin's presentation centred on the importance of efficient gas distribution systems. He discussed the complexities of managing gas flows within semiconductor fabs, where even minor fluctuations or contaminants can lead to significant production issues and yield losses. Participants will gain a comprehensive understanding of the critical aspects of special gas distribution systems, from design principles to safety considerations and future innovations. This knowledge will be invaluable for engineers and professionals involved in semiconductor manufacturing, helping them to enhance their processes and maintain high standards of safety and efficiency. A robust Q&A session continued throughout the session, where attendees engaged Dr. Chin in discussions on topics ranging from the scalability of gas distribution systems to the impact of digitalization on semiconductor manufacturing. The interactive exchange provided valuable insights and practical solutions to challenges faced by engineers and industry professionals in optimizing gas distribution networks. Illustrating practical applications, Dr. Chin shared case studies and best practices from leading semiconductor companies. These examples showcased innovative approaches to gas distribution system design, integration of smart sensors (GDS) for real-time monitoring (GMS), and implementation of closed-loop gas recycling systems (DCS) to minimize environmental impact and operational costs.

Looking ahead, Dr. Chin explored future trends in gas distribution for the semiconductor industry. He highlighted the growing demand for customized gas mixtures e.g. forming gas tailored to specific process requirements, and the integration of Industry 4.0 principles to achieve greater

automation and efficiency in total gas management (TGM). The event ended at noon with presentation of certificate to Dr. Chin and group photo session.



Group photo