

**MEDIA RELEASE
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A*STAR's IME and Lumerical Solutions Develop a Calibrated Compact Model Library for IME's Silicon Photonics Platform and Process Design Kit

The calibrated library of compact models will enable improved accuracy and reliability in photonic integrated circuit design and fabrication

Singapore — A*STAR's Institute of Microelectronics (IME) and Lumerical Solutions, Inc. (Lumerical), a global provider of photonic design software, today announced they have co-developed a calibrated compact model library (CML) for IME's silicon photonics platform and process design kit (PDK). The CML will help photonic integrated circuit (PIC) designers who use IME's silicon photonics process to improve the accuracy and reliability of their designs.

IME's 25G silicon photonics platform and PDK are built on validated processes and devices. They offer state-of-the-art performance and enable PIC designers to build reliable devices, system architectures and achieve prototyping and product manufacturing with ease.

PIC design is often manual and iterative, and is based on custom component libraries and workflows, which may lead to errors and multiple design revisions. Leveraging IME's capabilities in silicon photonics process and device technology, and Lumerical's expertise in integrated photonics device simulation and circuit design tools, the collaboration overcame these challenges by adding calibrated simulation models to IME's silicon photonics PDK. The CML enables designers to accurately simulate and optimise the performance of complex PIC designs prior to fabrication.

The CML includes 15 active and passive elements, from waveguides to modulators and photo detectors, and forms part of IME's silicon photonics PDK, along with process data, layer tables, cells for device layout and design rules (See **Annex A** for more details on the CML).

“With silicon photonics emerging as a leading technology platform for high bandwidth optical communication, R&D is critical in addressing the industry's

needs for increasingly complex photonic-electronic circuits. I am confident that the combined strengths of IME's capabilities in silicon photonics technologies for integration and manufacturing, and Lumerical's experience in innovating design tools will enable designers to produce quality photonic integrated circuits, and accelerate the production of next generation devices", said Prof. Dim-Lee Kwong, Executive Director, IME.

"The addition of calibrated models to IME's photonic PDK is a compelling step forward in establishing the design and fabrication ecosystem necessary for photonic circuit designers to realise the commercial potential of integrated photonic technologies," stated Todd Kleckner, co-founder and Chief Operating Officer, Lumerical. "We are excited to work with a renowned and innovative research institute like IME and support joint users of IME's MPW services and our design tools to confidently scale design complexity and deliver on their next ambitious design challenge."

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About A*STAR's Institute of Microelectronics (IME)

The Institute of Microelectronics (IME) is a research institute of the Science and Engineering Research Council of the Agency for Science, Technology and Research (A*STAR). Positioned to bridge the R&D between academia and industry, A*STAR IME's mission is to add value to Singapore's semiconductor industry by developing strategic competencies, innovative technologies and intellectual property; enabling enterprises to be technologically competitive; and cultivating a technology talent pool to inject new knowledge to the industry. Its key research areas are in integrated circuits design, advanced packaging, bioelectronics and medical devices, MEMS, nanoelectronics, and photonics.

For more information on IME, please visit www.ime.a-star.edu.sg.

About the Agency for Science, Technology and Research (A*STAR)

The Agency for Science, Technology and Research (A*STAR) is Singapore's lead public sector agency that spearheads economic oriented research to advance scientific discovery and develop innovative technology. Through open innovation, we collaborate with our partners in both the public and private sectors to benefit society.

As a Science and Technology Organisation, A*STAR bridges the gap between academia and industry. Our research creates economic growth and jobs for Singapore, and enhances lives by contributing to societal benefits such as improving outcomes in healthcare, urban living, and sustainability.

We play a key role in nurturing and developing a diversity of talent and leaders in our Agency and Research Institutes, the wider research community and industry. A*STAR oversees 18 biomedical sciences and physical sciences and engineering research entities primarily located in Biopolis and Fusionopolis.

For more information on A*STAR, please visit www.a-star.edu.sg.

About Lumerical Solutions

Since its inception in 2003, Lumerical has pioneered breakthrough simulation technologies that help bring new product concepts to life. Lumerical's photonic design tools are licensed in nearly 50 countries, by more than 800 of the world's most innovative organizations including 7 of the top 10 companies in the S&P 1200 Global IT Index and 44 of the top 50 research universities according to the Times Higher Education rankings. For more information, please visit www.lumerical.com.

About the Compact Model Library (CML)

The IME CML offers complete and accurate models that allow for circuit behavior prediction. In combination with Lumerical's photonic integrated circuit simulator, INTERCONNECT, the CML enables the design, analysis and optimization of circuits intended for fabrication in IME's Silicon Photonic platform.

Schematic or layout driven design workflows with leading Electronic Design Automation (EDA) tool vendors will be supported for integrating photonic circuit design and simulation into familiar electronic integrated circuit design methodologies, for layout, design verification and mask generation.

On July 1st, 2015, at the OptoElectronics and Communications Conference (OECC) in Shanghai, China, Lumerical and IME presented an overview of the CML and IME's silicon photonics during an invited talk entitled "Enabling Silicon Photonic Circuit Design and Fabrication". The presentation is available for review at http://www2.lumerical.com/resources/OECC2015_invited_talk.pdf