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Title of the presentation: Emerging microelectronics platforms based on hybrid integration

Short CV: Prof. Mircea Guina leads the Optoelectronics Research Centre at the Tampere University, Finland. He obtained the BSc degree (1996) in microelectronics and MSc degree (1997) in photonics from "Politehnica" University of Bucharest, and the PhD degree (2002) in physics at Tampere University of Technology. Prof. Guina's research is focused on developing compound semiconductors for optoelectronics using molecular beam epitaxy, and advanced photonic devices. He has made significant contributions to the development of novel semiconductor lasers, photonic integration technology, photovoltaics, quantum photonics, and laser applications. Prof Guina is a Fellow of Optica, and a Fellow of SPIE.

Abstract: While the decrease in the front-end technology node for Si-based microelectronics is experiencing a clear saturation at nm level, the progress in terms of chip functionality continues at a sustained pace. This is fuelled by the development of advanced packaging concepts, such as 3D integration and interposer technology, as well as the increased ability to combine functionalities provided by different material systems and technologies. To this end, the integration of electronic and photonic components has gained increased interest, benefiting from a tremendous market pull in appliactions such as data center

tranceivers, wearable sensors, virtual reality, AI, or neuromorphic computing. From this perspective, the recent progress in the development of hybrid photonic integrated circuits is reviewed, starting with an overview of the major trends in advanced packaging concepts. The synergy with CMOS microelectronics as a path to deliver advanced functionality is emphasized. Detailed technology developments and application examples are discussed for hybrid integration of emerging III-V optoelectronics and silicon-photonics.