

35th World Congress on

MATERIALS SCIENCE AND NANOTECHNOLOGY

July 22-23, 2019 Melbourne, Australia

Lightweight automotive solutions with new materials and optimization tools

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Innovative materials and manufacturing technologies have led to significant progress in vehicle light weighting over the past two decades. But difficulties to implement these technologies in medium to high volume vehicles have been hindered, mainly by higher costs and environmental impacts associated with the use of new lightweight solutions at various steps in the manufacturing process. Aiming at promoting lightweight technologies to the next level and a rapid transfer of innovations into series production, the Affordable Lightweight Automobiles Alliance (ALLIANCE) is a research project that investigates some key factors and process steps in lightweight development. It aims to develop novel advanced materials and production technologies that enable an average weight reduction of 25% on a production of 100 k units per year, at a cost of <3 €/kg. Many systems in development consist of a single component such as housings and structural parts. Here, the target weighing approach is less feasible and gets extended by capabilities to analyze an existing product generation with one to few components. The dimensions mass, CO₂ footprint and cost are key factors for the extended target weighing approach to also evaluate concepts on new product generations to select the most suitable design for the desired functions under consideration. Advanced support tools have been developed accelerating the design and evaluation process. Advanced materials with much better performance are ready for upscale. A reduction in global warming potential is higher than the formerly expected -6%. Weight targets on full vehicle level of 21 to 33% will be achieved.

Biography

Mbang Sama is currently Head of Technology at Mercedes-Benz Operations (Daimler AG), where he is high-level expert in digital transformation, industry 4.0 and related digitalization technologies. He has a comprehensive knowledge in automotive process and in modeling intelligent integrated process chains, as he managed many projects in R&D, production planning and manufacturing. He has studied Mechanical Engineering and Technical Informatics and completed his PhD in Information Technology. He is a Professor at the Technical Institute Sofia and Lecturer at the Karlsruhe Institute of Technology. He is also leading the Horizont2020 European project ALLIANCE.

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