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Driving Automotive Innovation:
A Survey of Solutions for the Automotive Industry

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ABSTRACT

Close engagement with the challenges arising from the design and creation of great cars energizes mechanical engineering innovation. Motivated by an imperative to optimize engine efficiency and performance, novel technology and tools provide engineers at FCA with new capabilities to improve and optimize engine design and function. This presentation will describe unique approaches to designing durable, high performing, and quiet valve trains. Federal regulations mandate significant improvements to vehicle efficiency. A second part of the presentation will illuminate an important strategy for improving vehicle fuel economy: down-speeding. Good torsional vibration control is critical to maximizing the potential benefit of this strategy. A patented crankshaft with pendulous counterweights reduces torsional vibration in an FCA prototype engine by 45%. The design, creation, analysis, and testing of this novel crankshaft will be described.

SPEAKER BIO

Bruce Geist is an applied mathematician and Technical Fellow at Fiat Chrysler Automobiles, currently working in powertrain simulation and computer aided engineering. He holds a B.S. in Mathematics from University of New Mexico, and an M.S. and Ph.D. from Rensselaer

Polytechnic Institute. He has been working in industry as an applied mathematician for more than 22 years, at FCA for more than 17 years. He has published in multiple applied mathematics and engineering journals on topics ranging from engine component design and optimization to applied number theory and cryptography. He has 13 granted patents and others pending. At FCA, he has carried out applied mathematical work to assist in design and optimization of engine components and systems, transmission components and systems, vehicle calibration and control, and powertrain and vehicle efficiency.