SAE 2013
Transmission & Driveline Symposium
Delivering Fuel Efficiency, Performance and Drivability

October 16-17, 2013
Troy, Michigan
Detroit Marriott Troy

EVENT GUIDE
Includes Final Program and Exhibit Directory

www.sae.org/events/ctf
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## EVENT OVERVIEW

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<th>Wednesday</th>
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<tr>
<td><strong>October 16</strong></td>
<td><strong>October 17</strong></td>
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<tr>
<td><strong>Salon ABCD</strong></td>
<td><strong>Salon ABCD</strong></td>
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<td>7:00 a.m. – 1:00 p.m.</td>
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<tr>
<td><strong>Registration</strong></td>
<td><strong>Registration</strong></td>
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<td>8:00 – 9:00 a.m.</td>
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<tr>
<td><strong>Opening Remarks / Keynote</strong></td>
<td><strong>Opening Remarks / Keynote</strong></td>
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<tr>
<td>8:00 – 8:30 a.m.</td>
<td>9:00 – 10:30 a.m.</td>
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<tr>
<td><strong>Powertrain Systems</strong></td>
<td><strong>Efficiency and Friction Reduction (Part 1)</strong></td>
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<tr>
<td>8:30 – 10:00 a.m.</td>
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<tr>
<td><strong>Networking Break</strong></td>
<td><strong>Networking Break</strong></td>
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<tr>
<td>Salon EFGH</td>
<td>Salon EFGH</td>
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<tr>
<td>Sponsored by:</td>
<td>10:00 – 11:00 a.m.</td>
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<tr>
<td><strong>CHRYSLER</strong></td>
<td><strong>Networking Lunch</strong></td>
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<tr>
<td>10:30 a.m. – 12:30 p.m.</td>
<td>Salon EFGH</td>
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<tr>
<td><strong>How is Hybridization and Optimization Impacting Transmissions &amp; Drivelines?</strong></td>
<td>11:00 a.m. – 12:30 p.m.</td>
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<tr>
<td>12:30 – 1:30 p.m.</td>
<td><strong>Efficiency and Friction Reduction (Part 2)</strong></td>
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<td><strong>Networking Lunch</strong></td>
<td>12:30 – 1:30 p.m.</td>
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<td>Salon EFGH</td>
<td><strong>Networking Lunch</strong></td>
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<td>1:30 – 3:00 p.m.</td>
<td>Salon EFGH</td>
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<tr>
<td><strong>New Transmission Designs (Part 1)</strong></td>
<td>1:30 – 2:30 p.m.</td>
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<td>3:00 – 3:30 p.m.</td>
<td><strong>Launch Devices</strong></td>
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<tr>
<td><strong>Networking Break</strong></td>
<td>2:30 – 3:00 p.m.</td>
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<td>Salon EFGH</td>
<td><strong>Networking Break</strong></td>
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<td>Sponsored by:</td>
<td>Salon EFGH</td>
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<td><strong>LINAMAR</strong></td>
<td><strong>Linamar</strong></td>
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<td>3:30 – 5:00 p.m.</td>
<td><strong>Power to Perform</strong></td>
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<tr>
<td><strong>New Transmission Designs (Part 2)</strong></td>
<td>3:00 – 4:30 p.m.</td>
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<td>5:00 – 6:00 p.m.</td>
<td><strong>Drivelines</strong></td>
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<tr>
<td><strong>Networking Reception</strong></td>
<td>4:30 p.m.</td>
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<tr>
<td>Salon EFGH</td>
<td><strong>Symposium Concludes</strong></td>
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<td>Sponsored by:</td>
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<td><strong>Lubrizol</strong></td>
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Let's face it; driveline design can be a real brainteaser. Reduced emissions. Improved fuel economy. Enhanced vehicle performance. Getting all the pieces to fit is challenging—especially when you can’t see the whole picture. That’s why you need one more piece to solve the driveline puzzle.

Introducing DrivelineNEWS.com—a single, all-encompassing website exclusively dedicated to driveline topics for both on- and off-road vehicles. Log on for the latest news, market intelligence, technical innovations and hardware animations to help you find solutions and move your business forward.

It takes ingenuity and persistence to succeed in today’s driveline market. Test your skills at DrivelineNEWS.com/Puzzle. Put all of the puzzle pieces together to enter to win a Kindle Fire.
JAMES BORGERSON
ENGINEERING GROUP MANAGER
GM POWERTRAIN’S ADVANCED
TRANSMISSION MECHANICAL GROUP

Jim Borgerson is the Engineering Group Manager for GM Powertrain’s Advanced Transmission Mechanical Group. Jim has more than 17 years of experience in a wide range of automatic transmission technology design and development, including CVTs, hybrids, planetary automatics, DCTs and other advanced transmission concepts. He has been involved in subsystem engineering, powerflow generation/evaluation, and/or transmission architecture for a number of GMPT transmission projects and programs, including GF6 (6T30) and the recently announced 8-speed RWD AT. He co-authored and presented the paper “Analytical and Test Evaluation of Planetary Gear Train Efficiency (Torque Related Losses) With Multiple Power Flow Arrangements” at the 2003 ASME International Power Transmission and Gearing Conference. He has more than 20 patents related to transmission subsystems and powerflow architectures. In 2007, he received the “Boss” Kettering Award, GM’s top award for technical innovation, for his work in automatic transmission powerflow synthesis. Jim has a BSME from Tulane University and an MSE from Purdue University. Before coming to GM, Jim served as a Naval Flight Officer for four years in one of the US Navy’s Anti-Submarine Warfare Squadrons.
THINGS WE CAN HELP YOU FIND:

- YOUR SANITY
- 54.5 MPG
- THE MEANING OF LIFE
- SUPERIOR NVH
- POWER AND PERFORMANCE
- LOWER EMISSIONS
- ALL THOSE MISSING SOCKS
- REDUCED VEHICLE WEIGHT
- A SHADY PARKING SPOT
- FASTER DEVELOPMENT CYCLES

FEV helps its customers to make the impossible, possible. When you are faced with a challenge, FEV stands ready to provide solutions you can use, from a partner you can trust. We can take your ideas into Überdrive.
SCOTT HALLEY
GLOBAL PRODUCT MANAGER
AUTOMATIC TRANSMISSION FLUIDS
LUBRIZOL CORPORATION

Scott Halley is the Global Product Manager for Automatic Transmission Fluids at The Lubrizol Corporation. He received his mechanical engineering degree from The University of Akron in 1992 and began his career at Lubrizol as a test engineer in their Mechanical Testing Laboratory. Scott’s initial work was with engine oil testing but the majority of his time focused Automatic Transmission Fluids and their performance characteristics. After 11 years in Lubrizol’s Wickliffe, Ohio test lab he had a 3.5 year assignment as the Manager of Lubrizol’s Hazelwood, England Mechanical Testing facility. Upon his return he worked several years coordinating development activities with OEMs and Tier One/Two suppliers for all areas of lubricants and fuel additives before assuming his current responsibilities.

JEREMY W. HOLT
VICE PRESIDENT
TREMEC CORP.

Jeremy W. Holt, Vice president is responsible for overall global sales, marketing and customer engineering activities of TREMEC. In addition plays a central role in the strategic planning and development of the TREMEC businesses currently located in Belgium, India, Mexico and having specific responsibility for US facilities and operations. He additionally has a leadership role in Business development activities including joint ventures, acquisition and divestiture activities. His wide experience in international business and network has been essential in his success in developing, manufacturing, selling or promoting of power train systems or components.

Prior to TREMEC, Jeremy held leadership roles in Advanced Powertrain and Engineering companies including Ricardo PLC (President US) a leader in engineering projects and services; Federal Mogul Piston Products (VP Product Engineering and Marketing) a supplier of precision engine components; NxtGen Emission Controls (CEO) a developer and supplier of patented syngas technology for emission after treatment; and Technology Management Consulting LLC (President) a management consulting and project service company.

Jeremy has 30 years’ experience in powertrain technology, operations, manufacturing, strategy, international business, engineering, and sales and marketing, in both mature public companies and start up technology firms. He is a graduate of the University of Bradford England, Holt holds a Bachelor of Engineering in Mechanical Engineering with honors and also holds a Master’s Degree in Business Administration from the University of Bradford Management School with special focus on technology forecasting and its application to automotive powertrain.

He is a founding and active member of the SAE North American International Powertrain Conference Leadership Team and has served as a member of the SAE Fellows selection committee.
Progress is a Matter of Detail

From the engine to the transmission to the chassis, our engineers analyze every detail of the automobile system. The many ideas we get from this analysis are translated into innovative products created by working closely with manufacturers. In everything we do, our main objective is to increase the performance, safety, and economy of today's automobiles.

Our ability to respond quickly to specific requirements is what makes us a renowned partner for the automobile industry. But it is our in-depth understanding of systems that has made us successful. That is why we will continue to focus on systems in the future – with uncompromising attention to detail.
HONG JIANG
MANAGER & TECHNICAL LEADER,
TRANSMISSION/DRIVELINE SYSTEMS
RESEARCH & ADVANCED ENGINEERING
FORD MOTOR COMPANY

Mr. Jiang has over 20 years of experience in Transmission and Driveline Engineering at Ford Motor Company. As the department manager & technical leader of transmission/driveline systems in Research & Advanced Engineering at Ford Motor Company, Mr. Jiang is currently leading the global design & development of new transmission & driveline systems including hardware, controls & calibrations for conventional transmissions and hybrid transmission/ drivelines.

JOSEPH LEMIEUX
BUSINESS UNIT DIRECTOR
TRANSMISSION & DRIVELINE
IAV AUTOMOTIVE ENGINEERING INC.

Mr. Jiang began his career with Ford in 1993 as a control engineer at Transmission Engineering in Livonia, Michigan. Later on he joined Transmission/Driveline Research and Advanced Engineering organization. During his tenure with Ford, he designed & developed a number of Ford advanced transmissions, including 5/6 speed automatic transmissions, CVT/IVT and PowerShift (wet & dry) automatic transmission, especially in the control & calibration area. Mr. Jiang also led the effort to design and develop the transmission / driveline systems & controls for advanced Hybrid vehicles.

Mr. Jiang has more than 35 pending & awarded patents in the area of transmission & driveline systems & controls for conventional & hybrid vehicles.

Joe Lemieux is the business unit director of Transmission & Driveline at IAV Automotive Engineering, Inc. He is responsible for all aspects of the division in North America, including sales, operation, technology development, profit and loss. Lemieux oversees the rapid growth of the department and strategies to meet the growing fuel efficiency requirements of the automotive industry.

Prior to joining IAV in 2011, Lemieux was a senior manager at GETRAG Transmissions Corporation, where he created and led the controls, software, electronics and calibration organizations. He worked as chief engineer at Ricardo Inc., more than doubling the number of engineers, leading a team that developed electrical and control systems and developing global management strategies, among many other initiatives. As a chief technologist and system architect at Electronic Data Systems, Lemieux developed technical solutions that won new business in the automotive, medical and aerospace industries globally. For a brief time, he was principal engineer at Lucas Varity, where he created new tools that reduced development time for new Anti-lock Brake System applications and developed custom microcontrollers. Lemieux also spent time as a program manager at both Johnson Controls Inc. and Ford, and as a senior engineer at General Motors. He has a strong background in engineering consulting for global customers and design and development of multiple hybrid systems and components.

Lemieux is a member of SAE International and the Institute of Electrical and Electronic Engineers.

He earned a Bachelor of Science in electrical engineering from General Motors Institute (now Kettering University). Lemieux also earned a Master of Science in electrical engineering and a Master of Business Administration from the University of Michigan. In addition, he is currently working on his PhD in automotive systems with a focus on electric, hybrid and fuel cell propulsion systems from the University of Michigan – Dearborn.
BERTHOLD MARTIN
SENIOR MANAGER/SPECIALIST ADVANCED TRANSMISSION ENGINEERING
CHRYSLER GROUP LLC

Berthold Martin is Senior Manager, Advanced Transmission Engineering, Chrysler Group LLC. Martin holds over 30 years in automatic transmission design/development at Chrysler as Product Engineer, Supervisor and Senior Manager/Specialist. He holds 31 Patents in automatic transmission technology and has authored 7 SAE technical papers. Martin is the Chair of the SAE Transmission & Driveline Committee and Chrysler Principal, USCAR Transmission Working Group. He is also the winner of the inaugural SAE/Timken Howard Simpson Automotive Transmission and Driveline Innovation Award and the USCAR Lifetime Achievement Award.

JOSEPH MUELLER
DRIVELINE SYSTEMS ENGINEER
MAGNA POWERTRAIN OF AMERICA

Joe Mueller is an engineer within the Driveline Systems team at Magna Powertrain of America, a global automotive supplier of powertrain systems and components.

Joe has nearly 20 years of professional engineering experience. In his current role as Senior Manager, Product Definition, he leads a team of mechanical, electrical and software engineers in the advancement and commercialization of automotive driveline systems. He has been with Magna Powertrain since 2006 in various engineering roles, including Engineering Manager of Product Architecture and Director of Research and Technology for North America. He also has prior engineering experience from Plug Power Hydrogen Fuel Cell Systems and New Venture Gear.

Joe graduated with a degree in Mechanical Engineering from Rochester Institute of Technology and then went on to receive an Executive Master of Business from Syracuse University. His educational experiences include a two-week seminar in Hong Kong, China and prior trainings include a focus on System Engineering following the “V” process, Six Sigma Green Belt and DFSS as well as a focus on Design for Assembly and Manufacturing.
STEVE THOMAS (RETIRED)
MANAGER, GLOBAL TRANSMISSION & DRIVELINE RESEARCH & ADVANCED ENGINEERING

Prior to retirement, Steve Thomas was Manager, Global Transmission & Driveline, Research & Advanced Engineering, Ford Motor Company. Mr. Thomas was responsible for all Ford Motor Company future technology development in the areas of automatic, manual and hybrid transmissions and also for driveline. Mr. Thomas has held numerous management and technical positions in all key areas of Transmission & Driveline Engineering during his 36 years at Ford Motor Company.

HAMID VAHABZADEH
DEPUTY VICE PRESIDENT GLOBAL TRANSMISSION OPERATIONS AVL POWERTRAIN ENGINEERING

Dr. Hamid Vahabzadeh is the Deputy Vice President, Global Transmission Operations at AVL Powertrain Engineering. He is responsible for the AVL transmission technology development. Prior to joining AVL in February 2013, Dr. Vahabzadeh spent 30 years with General Motors. He began his career at the General Motors Research Center working on CVT and hydrostatic transmissions. Later, he took over responsibility for the entire research activities on transmissions at General Motors. In 2000, Dr. Vahabzadeh assumed worldwide responsibility for the Advanced Engineering of all transmissions and for the transmission technology strategy at General Motors Powertrain. Dr. Vahabzadeh received his Ph.D. from the University of Wisconsin-Madison in 1982. He has published numerous technical reports and patents. He is also a member of the technical committee of the SAE and CTI transmission symposiums.

JOACHIM WOLSCHENDORF
VICE PRESIDENT VEHICLE & DRIVELINE ENGINEERING, CHIEF TECHNICAL OFFICER FEV INC.

Jochem Wolschendorf is currently Vice President Vehicle & Driveline Engineering, Chief Technical Officer, FEV, Inc. He is responsible for all vehicle and drivetrain activities for FEV in the US, including hybrid and electric vehicle developments. Mr. Wolschendorf initiated and executed the development of FEV’s Hybrid and Electric Vehicle Development Center in Auburn Hills, MI. This state-of-the-art development center includes electric motor test rigs, battery testing facilities, electric vehicle charge stations, as well as hybrid powertrain test cells.
GENERAL INFORMATION

HOURS OF OPERATION

REGISTRATION
Peninsula Grand Ballroom Foyer

On-site Registration
SAE Classic Member  $1025
SAE Premium Member  $1000
SAE Elite Member  $965
Non-Member  $1425
Technical Program
Participant  FREE
(Includes organizers and speakers)
Exhibitors
(1 per tabletop)  FREE

REGISTRATION HOURS
Wednesday, October 16
7:00 a.m. – 5:00 p.m.
Thursday, October 17
7:00 a.m. – 1:00 p.m.

TECHNICAL SESSIONS
Salon ABCD
Wednesday, October 16
8:00 a.m. – 5:00 p.m.
Thursday, October 17
8:00 a.m. – 5:00 p.m.

For more information, please contact Don Cooperrider at dcooperrider@iljin.com
GENERAL INFORMATION

EXHIBIT/TABLETOP DISPLAYS
Salon EFGH
Open during event hours

NETWORKING BREAKS
Salon EFGH
Wednesday, October 16
10:00 – 10:30 a.m.
3:00 – 3:30 p.m.
Thursday, October 17
10:30 – 11:00 a.m.
2:30 – 3:00 p.m.

Wednesday morning break sponsored by:

Chrysler

Thursday afternoon break sponsored by:

Linamar

NETWORKING LUNCHEONS
Salon EFGH
Wednesday, October 16
12:30 – 1:30 p.m.
Thursday, October 17
12:30 – 1:30 p.m.

NETWORKING RECEPTIONS
Salon EFGH
Wednesday, October 16
5:00 – 6:00 p.m.

Networking Reception Sponsored by:

Lubrizol

2013 Electric Powertrain Technologies Symposium

20 November 2013
Pullman Stuttgart Fontana
Stuttgart, Germany

www.sae.org/events/ept
OPENING ANNOUNCEMENTS/WELCOME

8:00 a.m.
Bert Martin, Chrysler Group LLC (See page 9 for complete abstract and biography)

8:05 a.m.
Mircea Gradu, Chrysler Group LLC (See page 40 for complete abstract and biography)

8:10 a.m.
OPENING KEYNOTE

AN OUTLOOK ON GLOBAL TRANSMISSION TECHNOLOGY, AND HOW THESE NEW TECHNOLOGIES RESONATE WITH CONSUMERS
David Petrovski, North America Powertrain, IHS (See page 22 for complete abstract and biography)

POWERTRAIN SYSTEMS
Chair: Scott Halley, Lubrizol (See page 6 for complete abstract and biography)

8:30 a.m.
IMPACT OF ENGINE/TRANSMISSION TRENDS ON FUTURE POWERTRAIN DEVELOPMENT
Kiran Govindswamy, FEV Inc. (See page 23 for complete abstract and biography)

9:00 a.m.
RICARDO’S 10DCT PLUS CONCEPT
Shaun Mepham, Ricardo Inc. (See page 24 for complete abstract and biography)

9:30 a.m.
TRANSMISSION CALIBRATION - AN ART, OR A SCIENCE?
Christoph Zach, AVL Powertrain Engineering (See page 26 for complete abstract and biography)

10:00 a.m.
NETWORKING BREAK
Salon EFGH

HOW IS HYBRIDIZATION AND OPTIMIZATION IMPACTING TRANSMISSIONS & DRIVELINES?
Chair: Jeremy Holt, TREMEC (See page 6 for complete abstract and biography)

10:30 a.m.
CONTROLS AND CALIBRATION IMPACTS OF HYBRIDIZED TRANSMISSIONS - AMT, DCT, CVT, AND AT
Joseph Lemieux, IAV Automotive Engineering Inc. (See page 27 for complete abstract and biography)

11:00 a.m.
ITERATIVE MODELING AND TRAJECTORY REFINEMENT FOR LAUNCH OPTIMIZATION
Hong Jiang, Ford Motor Co. (See page 28 for complete abstract and biography)

11:30 a.m.
PERFORMANCE EXPECTATION OF START-STOP SYSTEMS
Andy Yu, BorgWarner Inc. (See page 30 for complete abstract and biography)
ATTENTION SAE EVENT ATTENDEES:
FOR MORE SAE INTERNATIONAL TRANSMISSION RESOURCES....
engineering.sae.org/mytransmissioninfo
12:00 p.m.  
CONTROL SYSTEM DESIGN OPTIONS TO IMPROVE TRANSMISSION INTEGRATION WITH ENGINE STOP-START SYSTEMS  
Christopher Spangler, BorgWarner Transmission Systems Inc. (See page 31 for complete abstract and biography)

12:30 p.m.  
NETWORKING LUNCH  
Salon EFGH

NEW TRANSMISSION DESIGN (PART 1)  
Chair: Bert Martin, Chrysler Group LLC (See page 9 for complete abstract and biography)

1:30 p.m.  
CUSTOMER ACCEPTANCE OF DUAL CLUTCH TRANSMISSIONS – VOLKSWAGENS EXPERIENCES IN THE US MARKETPLACE  
Oliver Schmidt, Volkswagen Group of America Inc. (See page 32 for complete abstract and biography)

2:00 p.m.  
INFINITELY VARIABLE PLANETARY TECHNOLOGY  
Robert Smithson, Dana Holding Corporation (See page 34 for complete abstract and biography)

2:30 p.m.  
THE NEW DUAL CLUTCH TRANSMISSION 7G-DCT IN THE NEW FRONT WHEEL DRIVE VEHICLE GENERATION OF MERCEDES-BENZ  
Jens Dorfschmid, Daimler AG (See page 35 for complete abstract and biography)

NEW TRANSMISSION DESIGN (PART 2)  
Chair: Bert Martin, Chrysler Group LLC (See page 9 for complete abstract and biography)

3:30 p.m.  
SIMULATION TECHNOLOGY FOR ENHANCING EFFICIENCY AND REDUCING VIBRATION OF METAL PUSHING V-BELT CVT  
Toshihiro Saito, Honda R&D Co., Ltd. (See page 36 for complete abstract and biography)

4:00 p.m.  
LOW-COST MECHANICAL HYBRID  
Gert-Jan Vogelaar, Punch Powertrain (See page 38 for complete abstract and biography)

4:30 p.m.  
CHARACTERISTICS OF A HIGH TORQUE DUAL CLUTCH TRANSMISSION  
David R. Hadley, TREMEC (See page 39 for complete abstract and biography)

5:00 p.m.  
NETWORKING RECEPTION  
Salon EFGH

Reception Sponsored by: Lubrizol
In today’s automotive climate, the automotive community is increasingly called upon to think strategically and form unique relationships that expand the reach of the industry into a new era of collaboration. The SAE 2014 World Congress assembles the best talent in the automotive industry; experts, management teams, engineers, and executives alike gather to collaborate and address these current challenges, celebrate evolution and achievement over the last 100+ years, and promote the multitude of opportunities fundamental for a successful future.

While the industry continues to evolve, one thing remains constant – around every corner new possibilities exist; relationships evolve into partnerships...what once seemed innovative becomes the standard...the impossible becomes possible. By Creating New Possibilities at the 2014 World Congress, together we will shape the future of the automotive industry.
**THURSDAY**
**OCTOBER 17**
**SALON ABCD**

**8:00 a.m.**
**WELCOME**
Joachim Wolschendorf, FEV Inc. (See page 10 for complete abstract and biography)

**8:05 a.m.**
**OPENING KEYNOTES**
Mircea Gradu, Chrysler Group LLC (See page 40 for complete abstract and biography)

**8:30 a.m.**
**THE IMPACT OF ISO 26262 ON TRANSMISSION DEVELOPMENT**
Tom Tasky, FEV Inc. (See page 41 for complete abstract and biography)

**EFFICIENCY AND FRICTION REDUCTION (PART 1)**
Chair: Jim Borgerson, GM Powertrain (See page 4 for complete abstract and biography)

**9:00 a.m.**
**PERFORMANCE ENHANCEMENT OF UTILITY VEHICLE MANUAL TRANSMISSION BY OPTIMIZED MTF FORMULATIONS**
Simon David Evans, Lubrizol, Ltd. R. Ramaprabhu, Mathew Abraham, Mahindra & Mahindra, Ltd. (See page 42 for complete abstract and biography)

**9:30 a.m.**
**DEVELOPMENT OF TRANSMISSION FLUIDS DELIVERING IMPROVED FUEL EFFICIENCY BY MAPPING TRANSMISSION RESPONSE TO VISCOSITY AND ADDITIVE CHANGES**
Joe R. Noles, Infineum USA LP (See page 43 for complete abstract and biography)

**10:00 a.m.**
**SIMULATING VEHICLE FUEL ECONOMY TESTS WITH A TRANSMISSION TEST RIG**
Tracy McCombs, Afton Chemical Corp. (See page 44 for complete abstract and biography)

**10:30 a.m.**
**NETWORKING BREAK**
Salon EFGH

**EFFICIENCY AND FRICTION REDUCTION (PART 2)**
Chair: Jim Borgerson, GM Powertrain (See page 4 for complete abstract and biography)

**11:00 a.m.**
**REDUCED FUEL CONSUMPTION ENABLED BY OPTIMIZED TRANSMISSION PUMP TECHNOLOGY**
David Shulver, Magna Powertrain (See page 45 for complete abstract and biography)

**11:30 a.m.**
**WET CLUTCH PLATE GROOVE PATTERN DEVELOPMENT**
David Thomas Vierk, BorgWarner Transmission Systems Inc. (See page 46 for complete abstract and biography)
TECHNICAL PROGRAM

12:00 p.m.
SELECTABLE ONE WAY CLUTCHES: WHAT ARE THEY? WHERE CAN THEY BE APPLIED? WHAT ARE THEIR ADVANTAGES?
Brice A. Pawley, Means Industries Inc. (See page 47 for complete abstract and biography)

12:30 p.m.
NETWORKING LUNCH
Salon EFGH

LAUNCH DEVICES
Chair: Hong Jiang, Ford Motor Company (See page 8 for complete abstract and biography)

1:30 p.m.
OPTIMIZATION OF EFFICIENCY AND PERFORMANCE OF MODERN TRANSMISSIONS USING LOW FRICTION AND HIGH PERFORMANCE BEARING SOLUTIONS
Jitesh Modi, Schaeffler Group USA Inc. (See page 48 for complete abstract and biography)

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2:00 p.m.  
PERFORMANCE AND CHARACTERISTICS OF A VIRTUALLY-DRY WET DUAL CLUTCH  
Hendrik Pecceu, TREMEC (See page 49 for complete abstract and biography)

2:30 p.m.  
NETWORKING BREAK  
Salon EFGH

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DRIVELINES  
Chair: Joe Lemieux, IAV Automotive Engineering Inc. (See page 8 for complete abstract and biography)

3:00 p.m.  
AAM’S ECOTRAC™ DISCONNECTING ALL WHEEL DRIVE SYSTEM  
John C. Hibbler, AAM (See page 50 for complete abstract and biography)

3:30 p.m.  
NEW GENERATION DRIVELINES PROVIDING MOBILITY AND EFFICIENCY  
Michael Kirk, Chrysler Group LLC (See page 51 for complete abstract and biography)  
Seth Metzger, Dana Holding Corporation (See page 51 for complete abstract and biography)

4:00 p.m.  
CONSTANT VELOCITY JOINTS IN THE AUTOMOTIVE DRIVELINE  
Brian Nordin, GKN Automotive Inc. (See page 52 for complete abstract and biography)

4:30 p.m.  
SYMPOSIUM CONCLUDES
SAE Credentialing Central
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SAE International is pleased to provide focused credentialing opportunities for engineers and other professionals. Through SAE Credentialing Central, individuals are able to earn SAE Certification by successfully passing industry-vetted exams, derived from industry-generated bodies of knowledge. Additionally, certain programs that provide training followed by an industry-vetted exam provide the opportunity to earn an SAE Certificate of Competency.

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• **Design Review Based on Failure Modes (DRBFM) Certificate of Competency** — The DRBFM program focuses on competency and application of philosophy, preparation, change point FMEA, design review, and actions results and feedback.
• Additional credentials are under development.

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KEYNOTE: AN OUTLOOK ON GLOBAL TRANSMISSION TECHNOLOGY, AND HOW THESE NEW TECHNOLOGIES RESONATE WITH CONSUMERS

WEDNESDAY, OCTOBER 16, 2013, 8:10 A.M.

David Petrovski is a Principal Analyst in the North America Powertrain Forecasting group at IHS Automotive based in the Northville, MI office. Petrovski has more than a decade of experience in automotive marketing research and consulting with a focus on powertrain production forecasting. The bulk of this experience revolves around transmission forecasting, future powertrain product program intelligence, and market analysis.

Prior to joining IHS, Petrovski was a Senior Analyst at The Martec Group where he completed numerous market research and strategy consulting engagements on behalf of Fortune 500 clients in the automotive and specialty chemical industries. These engagements included new product assessments, product value and positioning, market size and segmentation, value-chain analysis, and product/technology benchmarking.

He is a graduate of the University of Michigan and holds a Bachelor of Science degree in Chemical Engineering.

ABSTRACT

The drivers for automotive technology development are well documented, and the march towards efficiency has begun. How will consumers accept these new technologies, especially if it alters their driving experience? What kinds of data exist that could be leveraged in understanding how consumers are reacting to new transmission designs? There are studies out there that claim consumers create more content today in a day than the entire population of the planet could possibly consume in a month. This is the world of big data. In this presentation, a global transmission technology outlook will be presented through 2025. We then will try and mine some of the big data to see what sort of perceptions exists around transmission technology.
IMPACT OF ENGINE/TRANSMISSION TRENDS ON FUTURE POWERTRAIN DEVELOPMENT  
WEDNESDAY, OCTOBER 16, 2013, 8:30 A.M.

Kiran Govindswamy currently holds the position of a Business Unit Director at FEV’s North American Technical Center in Auburn Hills, MI. In this position, he has responsibility for the areas of NVH, Transmission/Driveline Development, and Vehicle Integration. His educational background includes a Bachelor’s Degree in Mechanical Engineering from the University of Pune, India and Master’s and Doctoral Degrees from the Pennsylvania State University.

ABSTRACT
The automotive industry continues to develop new powertrain technologies aimed at reducing overall vehicle level fuel consumption. This presentation will focus on emerging trends in both engine development as well as transmission development. The influence of emerging trends in engine technology on future transmissions will be discussed. Similarly, the influence of future transmission trends on ongoing engine development will be outlined. Examples of advanced engine and transmission concepts will be presented.

NOTES
RICARDO’S 10DCT PLUS CONCEPT
WEDNESDAY, OCTOBER 16, 2013, 9:00 A.M.

Having spent many years in the development field of the R&D sector, creating and developing a range of automated transmissions, ranging from manual transmissions, automated Manual transmissions, dual clutch transmissions, planetary automatic transmissions, continuously variable transmissions, power split hybrid transmissions, electric axles and active anti-role bar hydraulic systems. My early carrier started in Civil engineering but transitioned to mechanical engineering when a young man fell in love with single seat racing cars. From the small beginning of self funding a volunteer position of a Formula ford racing team moving through World rally cars, Formula one car racing and stock car racing into the consultancy world picking up two world championships and 2 stock car racing championships along the way. During this journey holding positions from Junior Draftsman to chief Engineer and then on to management roles of Department manager - Design and Analysis to Product Group Director and now to Technical Director with a global responsibility for the planning of the research, and development activities within Ricardo’s Driveline and Transmission global team.

ABSTRACT
The Ricardo future DCT gear cluster achieves 8, 10 or 12 gears while still allowing power shifts for at all steps from first to top gear.

The cluster concept, packages within the pre-requisite 375mm for a front wheel drive transmission package zone.

The hydraulic system for control of the wet clutches allows lubrication, clutch cooling oil flow and the actuation pressure to be generated from a single electric motor while maintaining a dry clutch DCT hydraulic loss signature.
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DI Christoph Zach is Technical Expert for Transmission & Hybrid Calibration, Drivability Quality at AVL Powertrain Engineering. He is responsible for the drivability quality for transmission and hybrid calibration projects. The aim is to define guidelines, methods and processes to proof and ensure the required drivability quality according to milestones and quality gates of serial production programs as well as demonstrators.

He began his career at AVL Powertrain Engineering as a calibration engineer for transmissions and electronics. Later he took over responsibility for advanced methodology in the Transmission and Hybrid Calibration Team at AVL.

He obtained his graduate degree in Mechanical Engineering at the Technical University of Vienna 2006.

ABSTRACT

Recently, there has been an explosion of new transmission and engine developments for new vehicle applications. Each new application requires a significant amount of calibration work. In addition, the higher number of transmission gear ratios results in a significant increase in the amount of calibration effort. The only way to manage this ever increasing complexity is to apply methodical approaches to the calibration process and employ test automation and eliminate repeated loops of calibration effort. By combining math-based tools and automation methodologies, we are able to achieve drivability and shift quality targets for all driving and environmental conditions much faster than the traditional calibration methods.
CONTROLS AND CALIBRATION IMPACTS OF HYBRIDIZED TRANSMISSIONS - AMT, DCT, CVT, AND AT
WEDNESDAY, OCTOBER 16, 2013, 10:30 A.M.

Joe Lemieux is the business unit director of Transmission & Driveline at IAV Automotive Engineering, Inc. He is responsible for all aspects of the division in North America, including sales, operation, technology development, profit and loss. Lemieux oversees the rapid growth of the department and strategies to meet the growing fuel efficiency requirements of the automotive industry.

Prior to joining IAV in 2011, Lemieux was a senior manager at GETRAG Transmissions Corporation, where he created and led the controls, software, electronics and calibration organizations. He worked as chief engineer at Ricardo Inc., more than doubling the number of engineers, leading a team that developed electrical and control systems and developing global management strategies, among many other initiatives. As a chief technologist and system architect at Electronic Data Systems, Lemieux developed technical solutions that won new business in the automotive, medical and aerospace industries globally. For a brief time, he was principal engineer at Lucas Varity, where he created new tools that reduced development time for new Anti-lock Brake System applications and developed custom microcontrollers. Lemieux also spent time as a program manager at both Johnson Controls Inc. and Ford, and as a senior engineer at General Motors. He has a strong background in engineering consulting for global customers and design and development of multiple hybrid systems and components.

Lemieux is a member of SAE International and the Institute of Electrical and Electronic Engineers. He earned a Bachelor of Science in electrical engineering from General Motors Institute (now Kettering University). Lemieux also earned a Master of Science in electrical engineering and a Master of Business Administration from the University of Michigan. In addition, he is currently working on his PhD in automotive systems with a focus on electric, hybrid and fuel cell propulsion systems from the University of Michigan - Dearborn.

ABSTRACT
When an electrical machine is attached before, within, or after a transmission, it provides many challenges and opportunities in transmission control and calibration. In many cases, it requires a radical re-thinking of the control strategy to ensure that driver comfort is not negatively impacted, transmission quality, reliability, and durability are maintained or improved, and maximum fuel consumption improvement is obtained. This presentation will briefly introduce a few different Hybrid transmission architectures and discuss the controls and calibration impact during Start/Stop, Shifting, and Regenerative Braking.

NOTES
ITERATIVE MODELING AND TRAJECTORY REFINEMENT FOR LAUNCH OPTIMIZATION
WEDNESDAY, OCTOBER 16, 2013, 11:00 A.M.

Mr. Jiang has over 20 years of experience in Transmission and Driveline Engineering at Ford Motor Company. As the department manager & technical leader of transmission/driveline systems in Research & Advanced Engineering at Ford Motor Company, Mr. Jiang is currently leading the global design & development of new transmission & driveline systems including hardware, controls & calibrations for conventional transmissions and hybrid transmission/ drivelines.

Mr. Jiang began his career with Ford in 1993 as a control engineer at Transmission Engineering in Livonia, Michigan. Later on he joined Transmission/Driveline Research and Advanced Engineering organization. During his tenure with Ford, he designed & developed a number of Ford advanced transmissions, including 5/6 speed automatic transmissions, CVT/IVT and PowerShift (wet & dry) automatic transmission, especially in the control & calibration area. Mr. Jiang also led the effort to design and develop the transmission / driveline systems & controls for advanced Hybrid vehicles.

Mr. Jiang has more than 35 pending & awarded patents in the area of transmission & driveline systems & controls for conventional & hybrid vehicles.

NOTES
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PERFORMANCE EXPECTATION OF START-STOP SYSTEMS
WEDNESDAY, OCTOBER 16, 2013, 11:30 A.M.

Andy Yu has been Vice President, Core Engineering in BorgWarner Transmission Systems since May 2011. He is responsible for advanced engineering, core design and systems integration for Transmission Systems products globally. He is located at the BW Powertrain Technical Center in Auburn Hills, Michigan. Previously, he was Vice President of Engineering of Drivetrain Systems. He has served in various roles in BorgWarner Torque Transfer Systems since 1999. Before joining BorgWarner, Andy worked at General Motors Powertrain, at the Ypsilanti Transmission Product Engineering Technical Center for 23 years. He graduated from General Motors Institute with a Bachelor of Mechanical and Electrical Engineering degree.

ABSTRACT
Start-stop systems have been identified as one of the technologies with significant growth as auto makers are continuing to improve fuel economy. Today, there are various types of concepts in production and under development. This presentation will review performance differences of a few systems in production. Highlighting the pleasibility of automatic starts and stops. The focus will be on and around the impact on the automatic transmission. Culminating in a summary of areas of focus for OE’s and suppliers.
CONTROL SYSTEM DESIGN OPTIONS TO IMPROVE TRANSMISSION INTEGRATION WITH ENGINE STOP-START SYSTEMS
WEDNESDAY, OCTOBER 16, 2013, 12:00 P.M.

Chris Spangler has been a System Integration Technical Specialist in BorgWarner Transmission Systems since April 2012. He is responsible for electronic controls, calibration and vehicle integration for advanced transmission components and systems. He is located at the BW Powertrain Technical Center in Auburn Hills, Michigan. Prior to joining BorgWarner, Chris spent 17 years at General Motors Powertrain in various transmission analysis, controls and calibration roles in Ypsilanti and Milford, Michigan and Shanghai, China. He is a graduate of Purdue University with both Bachelor and Master’s degree in Aeronautical Engineering.

ABSTRACT
The integration of automatic transmissions with engine stop-start systems presents the challenge of coordinating the launch readiness of both the engine and the transmission. Transmission manufactures and OEMs utilize a variety of strategies ranging from supplemental electric pumps and accumulators to no supplemental oil sources in addressing this challenge. This paper focuses on modeling the transmission control module and control system and evaluating the impact of various design options on the transmission restart readiness. For purposes of the evaluation these selections are examined utilizing a DCT.

NOTES
Oliver Schmidt began working in Volkswagen engine development in 1997, after receiving a degree in mechanical engineering, from the University of Applied Sciences, in Hanover, Germany. Throughout his career at Volkswagen, he held various positions in development, marketing, and production; all within the field of powertrain development. Schmidt was the Head of Powertrain Product Management, for the VW brand, before moving to the United States, in March of 2012. Currently, he is responsible for everything that is related to tailpipe emissions; starting with regulatory, leading to certification and in the end, taking care of the defect reporting, up to 15 years in a car’s life.

ABSTRACT
The presentation will show the experience Volkswagen (and other companies) made with Dual Clutch Gearboxes in the US and how it impacts future engineering and design decisions in the Volkswagen Group.
Infinitely Variable Planetary Technology

Rob Smithson is vice president, powertrain innovations and engineering for Dana Holding Corporation's (NYSE: DAN) Light Vehicle Driveline group. Prior to this, he served as the chief technical officer and vice president of business development for Fallbrook Technologies Inc., and was a co-founder of the company.

Smithson’s 25 years of experience also includes stints as group leader of the Drivetrain Design and NVH group for Southwest Research Institute, product development engineering for Ford Motor Company; vice president of robot design and a co-founder of ARM Automation, Inc.; as well as spaceflight hardware engineering for the McDonnell-Douglas Astronautics Company.

Smithson holds a bachelor's degree in Mechanical Engineering from Auburn University and a master's degree in Mechanical Engineering from the University of Texas at Austin. Additionally, he holds an Executive Master of Science degree in Science & Technology Commercialization with honors from the McCombs School at the University of Texas at Austin. In 2009, Smithson was named a Fellow of the Society of Automotive Engineers (SAE International).

Abstract

This talk will cover the basic kinematics and structure of Continuously and Infinitely Variable Planetary devices, which Dana is introducing to the transmission market. The CVP/IVP has a unique mechanical configuration that will be shown to facilitate packaging in FWD, RWD, and AWD applications. Power path options available with the CVP/IVP and their characteristics will also be presented.
THE NEW DUAL CLUTCH TRANSMISSION 7G-DCT IN THE NEW FRONT WHEEL DRIVE VEHICLE GENERATION OF MERCEDES-BENZ

WEDNESDAY, OCTOBER 16, 2013, 2:30 P.M.

As the Senior Manager in charge of the development of double-clutch transmissions at the Mercedes-Benz Cars division of Daimler AG in Stuttgart, Germany, Jens Dorfschmid is responsible for the overall management of DCT Projects for front and all-wheel drive applications, consisting of mechanics, hydraulics, testing and software calibration. Prior to his current appointment he was a Project Manager for the 7G-TRONIC PLUS – seven speed automatic transmission building set for all Mercedes-Benz passenger cars, SUVs, vans and AMG sports cars. From 1994 to 1997, Jens worked for ZF Sachs AG. He joined Daimler AG in 1998. He obtained his graduate degree in Manufacturing Systems Engineering at Esslingen University of Applied Sciences in 1994.

ABSTRACT

Mercedes-Benz will be launching the new front wheel drive vehicle generation in the USA in 2013. Modified packaging, torque, and CO2 requirements for the vehicle were key factors behind the development of the 7-speed dual clutch transmission, or 7G-DCT. This article describes the new generation of automatic transmissions for front transverse installations at Mercedes-Benz and focuses on the following aspects in particular:

• Significantly reduced consumption
• Wide gear ratio spread with smooth gear operation
• Compact design and low overall weight
• Precise gear shifts and pronounced ease of shifting
• High-performance transmission for applications in the AMG vehicle segment
• Innovative pump concept
• Start/stop capability
• Modular construction
• Integration in torque-on-demand all-wheel-drive powertrain

NOTES
SPEAKER BIOGRAPHIES AND ABSTRACTS

SIMULATION TECHNOLOGY FOR ENHANCING EFFICIENCY AND REDUCING VIBRATION OF METAL PUSHING V-BELT CVT
WEDNESDAY, OCTOBER 16, 2013, 3:30 P.M.

Mr. Saito is a chief engineer with Honda Automobile R & D., Ltd. Co. in Japan and has been with Honda since 1986. His responsibility is to develop methodology of CAE application for transmission durability, torque capacity and NVH. Especially, recent years, I have been engaged for dynamics of CVT metal pushing V-belt and pulley and friction induced vibration of AT multiple plate clutches. He is a 1986, graduated a Master course of mechanical engineering in Waseda University.

ABSTRACT
In order to grasp details of transmission efficiency of a metal pushing V-belt CVT, a simulation technology that enables to capture the friction force and sliding velocity generated on element V-surface has been developed. The transmission efficiency results on some operating conditions have correlated with the actual measurement, the proportion of the friction loss between element and pulley was greater.

NOTES
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ABSTRACT

With the expected growth of vehicle ownership in emerging markets, environmentally friendly solutions are of global importance. The mechanical hybrid (MechHybrid5) proposed in this paper uses neither power-electronics nor additional batteries for energy storage, and as such keeps the on-cost of the hybrid system at a minimum. Nevertheless, the mechanical solution poses challenges on the Energy Management, hydraulic design and control strategies and calls for fundamentally new approaches in comparison with existing hybrid control strategies. With the expected growth of vehicle ownership in emerging markets, environmentally friendly solutions are of global importance. The mechanical hybrid (MechHybrid5) proposed in this paper uses neither power-electronics nor additional batteries for energy storage, and as such keeps the on-cost of the hybrid system at a minimum. Nevertheless, the mechanical solution poses challenges on the Energy Management, hydraulic design and control strategies and calls for fundamentally new approaches in comparison with existing hybrid control strategies. The paper discusses the technological solution, the hydraulic and the mechanical design, the energy management and control strategies. Finally, fuel consumption simulations are discussed.

1 Corresponding author: gert-jan.vogelaar@punchpowertrain.com, Punch Powertrain, Sint-Truiden, Belgium. 2 Punch Powertrain, Sint-Truiden, Belgium 3 Drivetrain Innovations, Eindhoven, The Netherlands. 4 Technische Universiteit Eindhoven, Eindhoven, The Netherlands. 5 The MechHybrid technology is developed by a consortium led by Drivetrain Innovations (concept owner, module design) in collaboration with Punch Powertrain (CVT and hydraulics design), Bosch Transmission Technology (advanced hydraulics), SKF (bearings, seals, lubrication), CCM (rotor dynamics) and TU/e (Energy Management and control). The project is subsidized by the ‘Pieken in de Delta’ programme, which is funded by the Dutch Ministry of Economic Affairs, Provence Noord-Brabant and SRE.
CHARACTERISTICS OF A HIGH TORQUE DUAL CLUTCH TRANSMISSION
WEDNESDAY, OCTOBER 16, 2013, 4:30 P.M.

ABSTRACT
Automated drivetrains, global demand for manual transmissions continues to grow. For these markets improvements in torque capacity, NVH, fuel efficiency and mass reduction are continually pursued to meet the needs of the customer. TREMEC has developed a new family of DCT transmissions of which the 900Nm is the lead product. The product respects the installation constraints typical for RWD applications. It is a 7-speed transmission with ratios selected so that the vehicle performance and fuel efficiency targets are properly satisfied. This presentation will provide an overview of the demonstrator project, including: project scope, target applications, product specifications, primary technologies, and performance.

NOTES
Mircea Gradu was appointed Vice President and Head of Transmission Powertrain and Driveline Engineering, Chrysler Group LLC on July 1, 2011. In this position, Mr. Gradu will be responsible for the design, development and release of all Transmission and Driveline systems for Chrysler Group LLC. In addition to this role, Mircea Gradu will continue as Head of Virtual Tools Analysis and is responsible for identifying, enhancing and deploying virtual engineering capability. Additionally, he is a member of the Product Committee, reporting to Sergio Marchionne, Chief Executive Officer, Chrysler Group LLC.

Gradu joined Chrysler in 2007 as Director – Transmission and Driveline Engineering. Significant elements of his professional background include:

• 2011, Vice President and Head of Transmission Powertrain and Driveline Engineering, Chrysler Group LLC
• 2009, Head of Virtual Tools Analysis and Head of Transmission and Driveline Engineering
• 2007, Director – Transmission and Driveline Engineering, Chrysler LLC, DaimlerChrysler

Gradu is a recipient of the 2008 Edward Cole Award for Automotive Innovation from the Society of Automotive Engineers (SAE) and serves as Vice President of SAE International – Automotive Sector 2010-2012. Gradu was appointed SAE Fellow in 2011 and is, together with his team, the recipient of the 2010 SAE-Timken Howard Simpson Innovation Award for Transmission and Driveline Engineering. He enjoys travel and outdoor recreation, including mountain biking, kayaking and kiteboarding.

Gradu holds a Doctorate in Mechanical Engineering from the University of Stuttgart in Germany (1996) and a Master's degree in Mechanical Engineering from the Polytechnic Institute in Bucharest, Romania (1987).

Gradu was born in Bucharest, Romania.
Tom Tasky
Manager Electronics & Controls
FEV Inc.

KEYNOTE: THE IMPACT OF ISO 26262 ON TRANSMISSION DEVELOPMENT
THURSDAY, OCTOBER 17, 2013, 8:30 A.M.

Tom is currently Manager, Electronics & Controls at FEV, Inc. He is responsible for electronics and controls development projects and functional safety at FEV and has over 24 years of industry experience in powertrain controls development, vehicle diagnostics, and electrical systems design, development and release for prototype and series production programs. He has extensive project management experience related to gasoline, battery electric, and hybrid vehicle applications.

ABSTRACT
As the industry continues to adopt ISO 26262 into their development processes, transmission experts in particular are challenged with meeting the demands for increased efficiency while ensuring that functional safety is met. Transmission developers and safety engineers need to take existing best practices and experience and apply them to new designs in order to satisfy safety goals in today’s aggressive product development cycles.
Mr. Evans has been in the lubricants industry for nearly 25 years following a 9 year spell with the British Army. My background is in engineering which led to me leading field testing at Lubrizol for a number of years before starting my current role as Automotive Gear Oil Technical Manager and Regional Business Manager for India and The Middle East. Within this role I have responsibility for liaising with OEMs globally on their future lubricant requirements, developing additives to meet these needs and implementing these newly designed technologies into the marketplace globally.

ABSTRACT

The general mechanical design and function of synchronized manual transmission has remained remarkably constant over the years with incremental improvements of the major components, gears, bearings, seals, synchronisers and of course fluids improving the performance of the overall product. The improvements are generally driven by market place demands aimed at durability and shift quality, but more recently fuel economy and efficiency have been the focus of attention. The desire to achieve maximum fuel economy along with the expected durability and shift quality has driven the development of dedicated Manual Transmission fluids. This presentation is a study of the relative performance in a Mahindra and Mahindra manual transmission of different formulation architectures with various base oils which were evaluated for shift force, fuel efficiency, operating temperatures and durability.
DEVELOPMENT OF TRANSMISSION FLUIDS
DELIVERING IMPROVED FUEL EFFICIENCY BY
MAPPING TRANSMISSION RESPONSE TO VISCOSITY
AND ADDITIVE CHANGES
THURSDAY, OCTOBER 17, 2013, 9:30 A.M.

After obtaining a Ph.D in Chemical Engineering from Cornell University, the Mr. Noles joined Exxon Chemical and held various technology and marketing roles including crankcase oil formulator and ATF market manager. When Exxon Chemical and Shell Chemical formed Infineum in 1999, the author was the Technical Service Manager for Speciality Additives which included ATF, Gear Oil, 2T, and Railroad oils and is now the Global Technology Advisor for transmission fluids responsible for developing factory fill ATFs for North American and European OEMs.

ABSTRACT
Transmission fluids can contribute to significant transmission fuel economy improvements through optimization of fluid viscosity and by minimizing torque losses in bearings and gears. Improving the efficiency of transmissions through manipulation of fluid viscometrics has been demonstrated by a number of transmission builders. While lowering fluid viscosity will yield efficiency gains, eventually the function and durability of the transmission will be negatively impacted. By mapping the response of a transmission to both viscosity and additive changes, the authors demonstrate that significant efficiency improvements can be gained with minimal changes to the fluid viscosity. The improvements in vehicle fuel efficiency was first demonstrated in chassis dynamometer testing using the US FTP75 test cycle and then confirmed by over-the-road testing.

NOTES
Tracy has worked for 14 years at Afton Chemical in Richmond, Virginia where I’m currently Senior Advisor responsible for OEM Technical Support. For 10 years I was the Driveline Testing Manager in charge of mechanical testing of drivetrain components, industrial hydraulics and was responsible creating research tests and custom test equipment. Previous employers include 11 years at LuK Incorporated in Wooster, Ohio and the Transportation Research Center in East Liberty, Ohio.

ABSTRACT
Fuel economy requirements for passenger cars are driving many new technologies into the market place. Transmission lubricants will continue to contribute to fuel economy gains both directly and in collaboration with new transmission technologies. Fuel economy gains in the 1% or less range are very valuable but difficult to measure reliably. Afton have developed new transmission and vehicle level test capabilities that can measure fuel economy gains reliably well below 1% with very good correlation to CAFE test protocol.
David Shulver is Global Product Manager – Oil and Vacuum Pumps – at Magna Powertrain, a premier supplier for the global automotive industry, effective August 2, 2013.

Since joining Magna in 2001, he has held technical positions of increasing responsibility in Europe, North America and Asia, including, most recently – Director of Engineering - Asia, for Magna Powertrain’s Fluid Pressure and Controls Group.

Prior to joining Magna Powertrain, David was Engineering Product Manager at Hobourn Automotive in the UK.

David earned a bachelor’s degree in Mechanical Engineering from the University of Greenwich in the UK and a Master’s in Business Administration at the Richard Ivey School of Business, in Ontario.

ABSTRACT

Although automated transmissions have improved in efficiency during the last decade, opportunities to reduce fuel consumption still exist through further optimization of the pumping system. High efficiency fixed displacement vane pumps offer significant benefits compared to gear style pumps, when correctly applied. Switchable or variable displacement pumps provide for further improvements for future transmissions applications when utilized with an effective control system. Customer demands for improved refinement, increased market penetration of stop start and hybrid systems result in a wider trend towards the application of electric auxiliary pumps that can also be integrated as part of a fully optimized system.
Mr. Vierk is currently the product engineering manager for friction products in North America for BorgWarner (BW). BW supplies all the major OEMs with clutch plates for automatic transmissions, all-wheel drive systems, torque converters, industrial/agricultural transmissions, and brakes. Mr. Vierk has over 25 years of experience in wet friction clutch design and development. He is responsible for friction material selection and development for specific applications. He handles the specific design and development testing of the clutch plates.

ABSTRACT
A key aspect in the design of wet clutch plates is the groove pattern. The groove pattern impacts the friction characteristics, the clutch durability, and the open clutch drag. Modern transmissions have clutches that have multiple duties. A given clutch may have to provide smooth shift feel at light throttle, handle high energy downshifts, and have low drag at high relative rotational speeds. Balancing all of these requirements necessitates a continual advancement in groove design and manufacturing.
SELECTABLE ONE WAY CLUTCHES: WHAT ARE THEY? WHERE CAN THEY BE APPLIED? WHAT ARE THEIR ADVANTAGES?
THURSDAY, OCTOBER 17, 2013, 12:00 P.M.

Brice Pawley
Graduated from Michigan Technological University in 1989 with a B.S. in Mechanical Engineering. Since graduation Mr. Pawley has worked at General Motor, Dana, T.B. Woods and Means Industries. He has worked for Means for 17 years. Positions within Means have included Senior Analyst, Product Engineer, Senior Product Engineer and today holds the position of Product Engineering Manager. In this role Mr. Pawley is responsible for all aspects of development and implementation of the selectable one way clutch technology. Prior to present development work Mr. Pawley was involved in 5 production launches of the Means one way clutch technology. Mr. Pawley has his professional engineering license and presently has six patents. In 2009 Mr. Pawley coauthored a paper with Farzad Samie of General Motors pertaining to the implementation of a selectable one way clutch in to a 6L50 automatic transmission.

ABSTRACT
Selectable Clutches are a relatively new entrant in to the automotive powertrain world. Derived from the Means Mechanical Diode (MD), the selectable clutch provides additional benefit and functionality beyond the basic MD one way clutch.

NOTES
OPTIMIZATION OF EFFICIENCY AND PERFORMANCE OF MODERN TRANSMISSIONS USING LOW FRICTION AND HIGH PERFORMANCE BEARING SOLUTIONS
THURSDAY, OCTOBER 17, 2013, 1:30 P.M.

Jitesh Modi
Group Leader/Principal Engineer
Schaeffler Group USA Inc.

Jitesh Modi is a Group Leader and Principal Engineer at Schaeffler Group USA. In his current leadership role, Mr. Modi empowers and motivates a team of Application and Product Engineers in Transmission group for bearing technology. As a Principal Engineer, he is responsible for the development and promotion of new ideas for bearings and transmission technologies since 2006. Boasting an 18 year career with Schaeffler Group spreading across various countries - India, Canada and USA, Mr. Modi has held several key positions in the areas of Design, Development and Application engineering of bearings in Automotive and Industrial Applications. As a bearing expert, he has developed unique bearing solutions for engine accessory drives and drivetrain applications in automotive industry. Mr. Modi graduated with a Bachelor’s degree in Mechanical Engineering from Sardar Patel University in India in 1992. He started his engineering career in power transmission industry at Elecon Engineering Ltd., India as a Gear Design and Project Engineer. Since 1995, he is a part of Schaeffler Group. Mr. Modi is a licensed Professional Engineer and a member of Experience Requirements Committee for licensure at Professional Engineers of Ontario, Canada since 2005. His hobbies are music, travel, yoga and watching sports.

ABSTRACT
The modern future transmissions dictate stringent requirements of higher efficiency and optimum power density. These needs can be addressed to a beneficial extent using low friction and weight optimized bearing solutions. The fuel economy can be further enhanced by application of these bearings in most optimal arrangements in transmissions. The material technology developments significantly help towards mass reduction and performance improvement through power density optimization. On basis of some discrete examples, new bearing concepts and arrangements in modern transmissions are described. Application of these bearings in automotive transmissions have yielded significant improvements in spin loss up to -70% benefit and fuel economy in a vehicle up to -1.5%. In addition, the customers have realized additional benefits of better NVH behavior, lower operating temperatures and improved durability. Easier assembly procedures and simplified mating parts design are additional benefits which have helped to reduce the overall costs of transmissions as well.

NOTES
As Director of Global Engineering, Hendrik is responsible for the research and development of the transmissions and transmission systems for TREMEC worldwide. He has over 35 years of automotive research and development experience. Prior to joining TREMEC, he was Managing Director for Mechatronic systems used in Dual Clutch Transmissions at Hoergiger (Belgium). Hendrick began his career at Dana Corporation (Belgium), where he was responsible for the R&D of transmissions used in off-highway vehicles. Hendrick has a degree in Mechanical Engineering from Hoger Technish Instituut (Ostend, Belgium), a Master’s degree in System Analyze from KU Leuven University (Leuven, Belgium), and a MBA degree from the Vlerick Business School (Gent, Belgium).

**ABSTRACT**

In DCT transmission applications, certain maneuvers create extremely demanding requirements on the whole clutch system. Clutch torque or speed control has to be very precise. At the same time, the thermal load on the clutch can be very high.

Virtually-dry wet clutches are optimal for these applications as parasitic losses can be minimized and clutch torque or speed and thermal load control can be optimized. Robust control strategies provide solutions for smooth drive away, performance launches, up and down shifting maneuvers, controlled low speed maneuvering, and off-road climbing without any thermal or maneuver quality risk.

This presentation will cover the features of the virtually-dry dual clutch system, its adaptability across all market segments in vehicle mobility, and its capability to achieve a variety of functions and performance results.
AAM’S ECOTRAC™ DISCONNECTING ALL WHEEL DRIVE SYSTEM
THURSDAY, OCTOBER 17, 2013, 3:00 P.M.

John Hibbler has been AAM’s Director of Advanced Technical Development since 2009. In this position, he has been involved in several key advancements in AAM’s technology, including the servo-hydraulic clutch system, the disconnecting EcoTrac™ all-wheel drive system, and the development of AAM’s Smart Multi-Position Linear Actuators. Prior to his current assignment John has held a number of other positions within AAM, including Director of Electronic Design and Development, Director of Worldwide Corporate Manufacturing Engineering, and an international assignment at AAM’s Albion Automotive subsidiary. John holds a BSEE and MSMSE from the University of Michigan – Dearborn, and has been awarded multiple patents.

ABSTRACT
Many of the components which comprise current AWD systems “go along for the ride” in normal driving – that is, they are accelerated to and from high rotational velocities, as well as maintained at those velocities, throughout the vehicle drive cycle. These components represent a considerable amount of rotational inertia and drag that must be overcome by the vehicle’s power source. AAM’s EcoTrac™ system is a new approach to minimizing the effect of this inertia and drag by disconnecting many of the rotating components from the driveline when they are not needed.
Michael Kirk is the Engineering Director for Manual Transmissions, Drivelines, and Axles at Chrysler Group LLC. Michael obtained his BSME from Oakland University and in 1982 joined Chrysler as an engineer in the Emissions Certification group at Highland Park, Michigan. Michael has worked in a number of leadership positions within Powertrain at Chrysler Group LLC, including Engine and Transmissions Adaptation, Throttle and Speed Controls, Gasoline Engine Programs, and the Jeep 4WD Systems and Driveline group. Michael is an active member of the USCAR Transmission Working Group and SAE International.

Seth Metzger is currently the Vice President of Light Vehicle Engineering at Dana Corporation, in Maumee, Ohio. He has been with Dana for 11 years, serving in various engineering and leadership roles in the organization. Areas of responsibilities are product engineering for axles and driveshafts, gear engineering, engineering services, complexity management, advanced development, advanced quality, and warranty. He holds a bachelor’s degree in mechanical engineering from the University of Toledo.

ABSTRACT
Driveline suppliers and OEM’s must find ways to contribute to the Greenhouse Gas & CO2 reduction requirements worldwide, while maintaining the durability, reliability, and performance requirements customers expect. The first step is accurate measurement of losses and efficiency for driveline components and systems. Additionally the industry is working to develop and introduce new and innovative technologies that will provide customers with great driveline performance while saving fuel. Viewpoints and visions are shared from both the OEM and Supplier Partner perspectives, with opportunity for questions and comments.
CONSTANT VELOCITY JOINTS IN THE AUTOMOTIVE DRIVELINE
THURSDAY, OCTOBER 17, 2013, 4:00 P.M.

Brian Nordin is a Regional Chief Engineer at GKN Driveline North America where he manages the application engineering activity for several OEM accounts. His product responsibility areas include halfshafts, propshafts and final drive units. Mr. Nordin holds a Bachelor’s degree in Mechanical Engineering from GMI Engineering & Management Institute (now Kettering University) and has been with GKN in various engineering capacities since 1999.

ABSTRACT
Constant velocity joints are widely used in today’s automotive drivelines in halfshafts, propshafts and other components. This presentation discusses why and where CVJs are used and their advantages over other types of joints. It will also discuss how a CVJ works and recent technology advances from GKN that result in CVJs with lower mass and higher efficiency to help reduce environmental impacts from automobiles.

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