

FINAL AGENDA: NGDM'14

- 1) Breakfast [7:30—8:00am]
- 2) Introduction and Welcome Remarks: Dr. Hillol Kargupta, President, Agnik [8:00—8:15am]
- 3) **Science of Data Analytics for Connected Cars and M2M** [8:15—10:25am]
Session Chair: Mark Licht, President, Licht & Associates

- a) **Dr. Ramasamy Uthurusamy, General Motors (Ret.)** [8:15—8:38am]



Title: Connectivity and Data Science: Synaesthetic Sixth Sense?

Abstract:

In its own right, each of the Connectivity, Big Data, Data Science, M2M, and HMI technologies has yielded significant benefits to multiple domains, systems, and people. However, greater impact has been achieved through the innovative integration of these technologies, especially in the connected vehicle domain. In this pervasive, distributed and ubiquitous environment, the objective has been to gain valuable insight through knowledge discovery in the fusion of connectivity data and data from multiple multimedia sensors. More importantly, in the coming decades these technologies and data together will evolve and automatically and seamlessly perceived as synaesthetic sixth sense by humans and machines. This presentation will outline some opportunities and challenges in such a scenario.

Bio:

Dr. Ramasamy Uthurusamy was General Director of Emerging Technologies at General Motors Corporation. Prior to joining GM he was with Exxon Production Research Company. Currently his research interests and expertise span four major areas: Knowledge Discovery in Databases and Data Mining (KDD); Artificial Intelligence (AI); Knowledge Management; and Advanced Web Technologies.

For about twenty five years at GM, he was first involved in AI and KDD research and later as a technology management executive. He developed and deployed some of the earliest automotive industry AI and KDD applications for service, sales, design, marketing, manufacturing, engineering, etc. His publication in 1993 on extracting knowledge from GM diagnostic databases was pioneering research on handling unstructured data. GM recognized his contributions with its Charles McCuen Special Achievement Award.

His doctoral dissertation in 1979 was one of the earliest applications of AI in Medicine. His research at Exxon and GM in the applications of machine learning and AI led to the development of new techniques to handle very large data with very large number of dimensions. He collaborated with others in industry and academia with similar needs and co-founded the field of KDD by co-organizing the first KDD Workshop in 1989. He continued

this effort by co-organizing and co-chairing successive KDD workshops and conferences and recently was 2013 SIGKDD Conference General Co-Chair. He was an elected Director of ACM SIGKDD and a member of SIGKDD Executive Committee. ACM SIGKDD recognized his contributions with its Distinguished Service Award. He co-edited the very first book on KDD in 1996 that set standards for the field and is still being used as a text and a reference. He co-edited the first special issue on KDD for the Communications of ACM in 1996 and by invitation co-edited the second special issue on KDD for CACM in 2002. He is a founding Editorial Board member of the first and premier International Journal of Data Mining and Knowledge Discovery and Editorial Board member of both AI Magazine and AI Topics. He is on CS Departmental Advisory Boards at four Universities. He has presented numerous Distinguished Lectures, Keynotes and Invited Talks in the USA, Germany, Australia, India, South Korea, etc., on KDD, AI, Machine Learning, etc. He was the Secretary-Treasurer of IJCAI from 2002 to 2009; Advisory Board Member of IJCAI-2011 and of IJCAI- 2001; IJCAI-95 Video Chair; IJCAI-89 Local Chair; AAAI-04 Senior Program Committee member; Technical Program Chair of IAAI-99 and IAAI-98; Technical Program Co-Chair of three Indian AI Conferences; Technical Program Cluster Chair of ORSA/TIMS-94; Technical Program Co-Chair of SPIE 1993, etc.

He received his Ph.D. from Purdue University. He has taught at Purdue, University of Idaho, and Oakland University. He is an IEEE Fellow, Senior Member of AAAI, and Member of ACM and Sigma Xi. He was a 2002 Winter Olympics Torchbearer.

b) Rick Kreifeldt, Vice President, Research and Innovation, Harman International [8:38—9:01am]

Title: *Opportunities and Challenges using Big Data Analytics to Personalize the Car Experience*



Abstract:

As vehicles become connected they are increasingly more and more complex. This complexity reduces the customer's satisfaction and increases concerns of Driver Distraction. This will talk will address the opportunities provided big data analytics to reduce the clutter of menus and unused features and provide a personalized user experience in the vehicle. The benefits include the ability to better proactively anticipate the needs of the user as well as develop systems that adapt their HMI based on the user and the current driving situation.

While there are many opportunities with machine learning and data analytics, there are also many challenges. Spotty network connectivity and indeterminate network latency are just a few of the challenges. Customers in a vehicle have a much higher expectation of quality than they do in mobile, therefore the automotive industry cannot simply follow mobile norms. This talk will present the real world challenges that HARMAN has encountered as a leading provider of connected vehicle space and how we are addressing them with a unique hybrid onboard/off board solution.

Bio:

Rick has 20 years experience in R&D at HARMAN and is currently responsible for company-wide advanced research. Previous to his current role in centralized R&D for HARMAN, he was head of Automotive Research, led the HARMAN Professional HiQnet networking initiative and before that was Director of Engineering for the dbx Professional brand and prior to that a DSP engineer developing audio signal processing algorithms for Harman. Rick has served as the Chairman and President of the AVnu Alliance since it was founded in 2009. Rick holds fourteen patents in the areas of DSP algorithms, networking protocols and system design. A National Merit Scholar, Rick graduated Cum Laude from Utah State University with a BSEE. While conducting graduate studies at Utah State, he was involved in several significant DSP research projects, including time at the Los Alamos National Lab Theoretical Division.

c) **Dr. Tao Zhang, Chief Scientist for Smart Connected Vehicles at Cisco Systems [9:01—9:24am]**



Title: *Securing the Internet of Things: Challenges and Trends*

Abstract:

More things are being connected to address a growing range of business needs. In fact, by 2020, more than 50 billion things will connect to the Internet—seven times our human population. Examples are connected vehicles, wearable health and performance monitors, smart grids, connected oilrigs, and connected manufacturing. This Internet of Things (IoT) will revolutionize the way we work, live, play, and learn. However, inadequate security will be a critical barrier to large-scale deployment of IoT systems and broad customer adoption of IoT applications. Simply extending existing IT security architectures to IoT will not be sufficient. The IoT world requires new security approaches, creating fertile ground for innovative and disruptive thinking and solutions. In this talk, I will talk about major technical challenges in securing IoT and some of the interesting technology trends that are emerging.

Bio:

Dr. Tao Zhang has been a Distinguished Engineer and the Chief Scientist for Smart Connected Vehicles at Cisco Systems since 2012. He was elected a Fellow of the IEEE in 2010. For over 25 years, he has been directing research and product development in broadband, mobile, and vehicular networks. His leadership and technical work have resulted in new technology, standards, and products that have made significant and broad impact. Dr. Zhang has co-authored two books “Vehicle Safety Communications: Protocols, Security, and Privacy” and “IP-Based Next Generation Wireless Networks” published in 2012 and 2004 respectively by John Wiley & Sons. He holds 34 patents and has published over 70 peer-reviewed technical papers on international journals and conferences. Dr. Zhang was a founding member of the Board of Directors of the Connected Vehicle Trade Association (CVTA) in the US. He has been serving on the industry advisory boards for several research organizations. He is the Chair of the IEEE Communications Society Technical Sub-Committee on Vehicular Networks and Telematics Applications. He has been serving on editorial boards or as a guest editor for multiple leading technical journals including the IEEE Internet of Things (IoT) Journal, IEEE Transactions on Vehicular Technology, IEEE Journal of Selected Areas in Communications, and the Springer

Journal of Wireless Networks. Dr. Zhang was also an adjunct professor at multiple universities. He has been frequently invited to speak at international technical conferences.

d) **Dr. Hillol Kargupta, President, Agnik [9:24—9:47am]**



Title: Data Analytics for Connected Cars: Analyzing Data Onboard and in-Cloud while Protecting Privacy

Abstract:

Analyzing data in the connected car distributed environment is very different from most traditional Big Data applications. Cars have thousands of sensors generating significant volume of data. Cars connected over limited bandwidth wireless connections

create a distributed environment where the traditional in-cloud analytics applications do not scale well. We need the right blend of vehicle-onboard analytics and backend in-cloud analytics in order to minimize data transmission, provide real-time analytics-driven services, reduce power consumption of your smartphone and protect privacy among others. This talk will explore these fundamentals for designing a scalable platform for the next generation of connected car services. It will provide several use-cases for analyzing data onboard and in-cloud. Moreover, it will also explore how one can design pattern-preserving cryptography for data analysis algorithms so that we can compute analytics directly from encrypted data. The idea is to create mathematical transformations of the privacy-sensitive telematics data so that the transformed data is encrypted but you can still do modeling, driver scoring, and analysis with same accuracy as if you are using the raw unencrypted data.

Bio:

Dr. Hillol Kargupta is the co-founder and President of AGNIK, a vehicle performance data analytics company for mobile, distributed, and embedded environments. He is also a Professor of Computer Science at the University of Maryland, Baltimore County and currently on leave. He received his Ph.D. in Computer Science from University of Illinois at Urbana-Champaign in 1996. His research interests include mobile and distributed data mining. Dr. Kargupta is an IEEE Fellow. He won the IBM Innovation Award in 2008 and a National Science Foundation CAREER award in 2001 for his research on ubiquitous and distributed data mining. He and his team received the 2010 Frost and Sullivan Enabling Technology of the Year Award for the MineFleet vehicle performance data mining product and the IEEE Top-10 Data Mining Case Studies Award. His other awards include the best paper award for the 2003 IEEE International Conference on Data Mining for a paper on privacy-preserving data mining, the 2000 TRW Foundation Award, and the 1997 Los Alamos Award for Outstanding Technical Achievement. His dissertation earned him the 1996 Society for Industrial and Applied Mathematics annual best student paper prize. He has published more than one hundred peer-reviewed articles. His research has been funded by the US National Science Foundation, US Air Force, Department of Homeland Security, NASA and various other organizations. He has co-edited several books. He served as an associate editor of the IEEE Transactions on Knowledge and Data Engineering, IEEE Transactions on Systems, Man, and Cybernetics, Part B and Statistical Analysis and Data Mining Journal. He was the Program Co-Chair of 2009 IEEE International Data Mining Conference, General Chair of 2007 NSF Next

Generation Data Mining Symposium, Program Co-Chair of 2005 SIAM Data Mining Conference and Associate General Chair of the 2003 ACM SIGKDD Conference, among others.

- e) **Dr. Michael Cavaretta, Data Scientist and Manager, Ford Motor Company [9:47—10:10am]**



Title: Big Data ‘Driving’ Big Opportunities

Abstract:

Ford Motor Company has a strong history of being a data-driven company. Analytics and data guides everything the company does from sales and marketing to customers service and product design. As a Data Scientist at Ford for more than 15 years, Mike Cavaretta will discuss the challenges, opportunities and impacts that big data and analytics can have on the bottom-line as well as projects like OpenXC that encourage makers to create new applications leveraging data from their vehicle.

Bio:

Michael Cavaretta is a Data Scientist and Manager at Ford Motor Company in Dearborn, Michigan. He is a leader for the Predictive Analytics group in Research and Advanced Engineering. In this department, he guides the team to work as internal consultants using technologies in Big Data, Machine Learning, Artificial Intelligence, Data Mining, Text Mining, and Information Retrieval to improve business processes across the enterprise. Michael has worked at Ford Motor Company since April 1998.

- f) Group Discussion [10:10—10:25am]

- 4) 10:25—10:40am Coffee

- 5) **Business of Big Data for Connected Cars and M2M [10:40—12:15pm]** Session Chair: Curt Davies, Corporate Strategist, American Family Insurance

- a) **Praveen Chandrasekar, Research Manager, Frost & Sullivan [10:40—11:00am]**



Title: Will Big Data Present Opportunities for OEMs/Connected Services Vendors to Create a Sustainable Business Model?

Abstract:

This talk will address the following questions regarding the Big Data opportunities for OEMs and Connected Car Services industry:

1) What are the domains/areas from an internal/external vehicle perspective where big data will have the maximum impact in terms of revenues/savings for the auto ecosystem?

2) What are the key challenges from a big data product offer developing/implementation - IT infrastructure requirement, connectivity requirements, data privacy/ownership issues, etc.

3) From a monetization perspective, what type of services/features and associated business

model offer the biggest potential for big data for OEMs/connected service providers.

The talk will also present sample case studies of success stories for sustainable big data business models/feature offerings - e.g. Usage-based insurance, Crowdsourced traffic, Warranty analytics, Prognostics, etc. It will conclude with key takeaways for different ecosystem partners and OEMs.

Bio:

Praveen has more than 10 years of automotive strategy consulting and research experience. He leads the Frost & Sullivan global infotainment research and consulting assignments. He has a degree in Business Management from Indian Institute of Management, Calcutta and Bachelor of Engineering in Mechanical Engineering from Birla Institute of Technology and Science, Pilani, India.

b) **Richard Wallace, Director, Transportation Systems Analysis group, Center for Automotive Research [11:00-11:20am]**



Title: The Convergence of Connected and Automated Vehicle Technology: Market and Data Challenges and Opportunities

Abstract:

This presentation will provide insight into opportunities and challenges associated with connected vehicle data, as well as examine the coming convergence of connected and automated vehicle technology. The automobile industry appears to be on the cusp of revolutionary change, with the potential to dramatically reshape not just the competitive landscape but also to better understand the way people interact with their vehicles through data collection. The technology and associated data also has the potential to reshape business models within the industry, and this too will be addressed.

Bio:

Richard Wallace, M.S., is Director, Transportation Systems Analysis group within the Center for Automotive Research (CAR). He has 22 years of experience designing, conducting, and managing transportation projects and research. Amongst other responsibilities, Mr. Wallace leads CAR's connected and automated vehicle efforts for the Michigan Department of Transportation and CAR's automotive industry partners. He has led past projects for the Michigan Economic Development Corporation, the Michigan International Speedway, DENSO, and others. His work has been published in *Transportation Research Record* and other publications. Currently, he is President of the Intelligent Transportation Society of Michigan (term ending June 1, 2014).

c) **Koji Kamimura, Manager, IS Connected Services Data, Nissan [11:20-11:40am]**

Title: Leveraging Big Data with Connected Vehicles to Realize a New Ecosystem

Abstract:

From personalized owner services to the autonomous car, the Connectivity and Big Data have been recognized as key enablers for realizing new business insights leading to a new



ecosystem of services for the OEM. In this talk, I will discuss how Nissan has leveraged Big Data with CARWINGS®, an innovative ICT / telematics system for Nissan LEAF®, to provide value-added services for owners and enable synergistic relationships among multi-industry with B2B / B2B2C models.

Bio:

Mr. Koji Kamimura is a manager in Information System at the Nissan Research Center in Silicon Valley focusing on Big Data architectures and analytics for the connected car. At Nissan, he contributed the development of global telematics data center for Nissan LEAF and led the development of B2B connected services ranging from Usage Based Insurance, EV Energy Management, and Car Sharing. Prior to Nissan, he worked at IBM Service in Japan as a strategy consultant and an IT architect in Systems Engineering for manufacturing companies. He holds a bachelor's degree in Computer Science from University of Florida.

d) **Roger Lanctot, Associate Director, Strategy Analytics [11:40—12:00pm]**



Title: Prioritizing Safety and CRM over Apps in Vehicle Connectivity

Abstract:

With BMW, GM and other car makers launching in car app stores it is easy to lose sight of the core value propositions that will transform the connected car market. Software updates over the air able to preserve safe operation of the vehicle and CRM applications intended to improve customer retention are essential elements of the connected car. Roger will discuss the state of play and future directions in these application segments.

Bio:

Roger Lanctot is associate director in the global automotive practice at Strategy Analytics and has an influential voice in the definition of connected car strategies in the industry. He draws on more than 25 years as an industry analyst and consultant and routinely delivers the most provocative insights at events such as Big Data for Connected Cars. He is a graduate of Dartmouth College.

e) **Group Discussion [12:00—12:15pm]**

6) **Industry Sponsored Session [12:15—12:35pm]**

[Dr. Kandathil Jacob](#), General Manager Advanced Analytics, Wipro Technologies and Sanjeev Aurora, Executive Vice President, Product development, Innovation and Growth, JCB India

Title: Monetizing Telematics Services - Developed versus Emerging Markets

Abstract:

The focus of this 2-part presentation is on telematics services that are paid for by either the vehicle owner, or by service providers who see the business value in gaining access to the data that is

captured from the vehicle. Applications such as Fleet Management and Usage Based Insurance are now mature in developed markets, and are beginning to make inroads into emerging markets. We will compare the recent trends in vehicle telematics monetization in developed markets such as US, EU and Japan, with innovative applications that are being piloted in emerging markets such as India, China and Brazil. Universally, vehicle owners are less than willing to pay a subscription fee for telematics-based insights. So revenue growth is expected to come from OEMs and dealers who can leverage telematics data to drive consumers to servicing dealers. In addition, telematics data can be mashed up with data from other sources, and analyzed using sophisticated tools, to generate cost savings, increased revenue, and improved customer satisfaction for local businesses and government organizations. The second half of this presentation will be a case study from India, to illustrate how telematics can be extended to construction equipment on wheels such as a backhoe, and how the data generated is being mined to deliver value to the OEM and the dealers.

Bio of Dr. Kandathil K. Jacob:



Dr. Kandathil Jacob is the General Manager and Global Head of Advanced Analytics for the Manufacturing /Hi Tech vertical, at Wipro Technologies. He manages customer relationships and provides thought leadership in designing and developing innovative analytical solutions to complex business problems for Wipro’s clients. His engagements span the entire customer value chain and include trade and marketing spend optimization, customer life cycle analytics, manufacturing quality management, supply chain analytics and most recently machine learning analytics using Big Data platforms. He has been a thought leader in the area of vehicle telematics and has been interacting with several OEMs to explore how the applications of Advanced Analytics can be used to develop new ways to monetize vehicle telematics. He has previously held Director level positions at HCBC, Apple and FICO. Dr. Jacob is based in San Diego, California.

Bio of Srinivas Rao:



R Srinivas Rao (RSR) is Vice President– Service Transformation Solutions in the Manufacturing & HiTech Business Unit for Wipro Technologies. He is responsible for building large platform solutions for the business unit across industry verticals and process areas and is part of the BU Leadership team. His main focus area currently is helping manufacturers transform their After Market Services capabilities and improving Service Management for field assets using remote connectivity technologies and advanced analytics. This includes major focus on Automotive and Heavy Equipment sectors using connected vehicle M2M technologies.

RSR has 25 of years’ experience in the IT services industry out of which close to 18 years was spent in Wipro. Over the years, he played various roles in the IT industry in areas such as Customer Support, Systems Analysis, Design and Development, Program / Delivery Management and Account Management. He was the Global Delivery Head for strategic accounts for many years before moving into a business leader role responsible for vertical P&L. Over a six-year period, RSR had managed

two leading industry verticals – Automotive and Pharmaceuticals. He has significant experience working with global clients in regions such as US, Western Europe, Japan, Asia Pacific and India. He is also the head of Wipro's Hyderabad Development Centre and member of the Managing Committee of ITSAP, the association of IT and ITeS companies in the state of Andhra Pradesh in India.

RSR's passions include leadership building, building innovative solutions to solve industry problems and process improvements. RSR created Centers of Excellence within Wipro that have published several white papers and points of view on industry topics across Discrete Manufacturing and Life Sciences industries. One of them went on to win a US patent.

RSR holds a Master of Computer Applications (MCA) degree from University of Delhi and a Post Graduate Diploma in Business Administration from Bangalore University.

7) 12:35—1:35pm Lunch Provided by the Conference

8) Enabling Data Analytics for Connected Cars and M2M [1:35—3:45pm]

Session Chair: Hillol Kargupta, President, Agnik

a) Dr. Ashok Srivastava, Chief Data Scientist, Verizon [1:35—1:58pm]



Title: Analytics and Large-Scale Machine Learning with Applications to Connected Machines

Abstract:

This talk gives an overview of an approach to gather, monitor, and interact with large numbers of stationary and mobile connected machines. We will cover aspects of the infrastructure and algorithmic developments that are being made at Verizon to support new products, services, and technologies based on large-scale machine learning along with preliminary findings.

Bio:

Ashok N. Srivastava, Ph.D. is the Chief Data Scientist at Verizon. He leads a new research and development center in Palo Alto focusing on intelligent systems powered by big data and analytics. He is the Editor-in-Chief of the AIAA Journal of Aerospace Information Systems. Ashok is a Fellow of the IEEE, the American Association for the Advancement of Science (AAAS), and an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA). Ashok is the author of many research articles in data mining, machine learning, and text mining, and has edited a book on Text Mining: Classification, Clustering, and Applications (with Mehran Sahami, 2009). Two additional books were published in 2012: Advances in Machine Learning and Data Mining for Astronomy (with Kamal Ali, Michael Way, and Jeff Scargle) and Machine Learning for Engineering Systems Health Management (with Jiawei Han).

b) **Dr. Chris Borroni-Bird, Vice President, Strategic Development at Qualcomm [1:58—2:21pm]**



Title: Enabling Connected and Electric Vehicles

Abstract:

A sustainable mobility solution will require advances in vehicle connectivity, autonomy and electrification. This combination is expected to address mobility challenges associated with energy, environment, safety, congestion, parking, affordability and accessibility while enhancing the ride experience and making it more productive. Qualcomm is developing several technologies that enable this future such as dedicated short range communications and wireless EV charging. The future potential of a connected, autonomous, electrified vehicle system to generate and consume Big Data will also be discussed.

Bio:

Dr. Chris Borroni-Bird joined Qualcomm Technologies Inc. as a VP of Strategic Development in August 2012 and is responsible for developing and implementing a transportation vision around wireless technologies (both wireless power for electric vehicles and wireless communications between vehicles).

Prior to this, Dr. Borroni-Bird was GM's Director of Advanced Technology Vehicle Concepts and Electric Networked Vehicle (EN-V) Program. The EN-V concepts are small battery powered urban mobility vehicles that can be driven autonomously and were demonstrated extensively at the 2010 Shanghai World Expo. Chris was selected as one of Automotive News' Electrifying 100 in 2011. He also led GM's Autonomy, Hy-wire and Sequel "skateboard" vehicle concepts.

Before joining GM in 2000, he led Chrysler's gasoline fuel cell vehicle development and was inducted into the Automotive Hall of Fame as a Young Leader in 2000. Dr. Borroni-Bird is co-author of "Reinventing the Automobile: Personal Urban Mobility for the 21st Century", with Larry Burns and the late Bill Mitchell, that was published by MIT Press in 2010. Chris obtained his Bachelors and Masters degrees in Natural Sciences from King's College, Cambridge, completed his Ph.D in Surface Science from Cambridge University and performed Post-doctoral research in solid state physics from the University of Tokyo.

c) **Dr. Raj Rajkumar, Professor & Co-Director, General Motors-Carnegie Mellon Vehicular Information Technology Lab, Carnegie Mellon University [2:21—2:44pm]**

Title: On the Road to Connected Automation

Abstract:

Connected vehicles and automation represent two significant innovations in automotive transportation. Connectivity lends itself to widespread and mobile access to cloud services, location-based applications, real-time mobility analytics and seamless transition from/to



the automobile for the end-users. Automation on the other hand requires huge amounts of computing power and storage. Coupling the two is natural and inevitable. This talk will provide an overview of the rapid development of connected automation, and identifies some of the challenges that lie ahead.

Bio:

Raj Rajkumar is the George Westinghouse Professor of Electrical and Computer Engineering at Carnegie Mellon University in Pittsburgh, with a courtesy appointment in its Robotics Institute. He also serves as the Director of Technologies for Safe and Efficient Transportation (T-SET), the USDOT National University Transportation Center on Safety. He also co-directs the General Motors-Carnegie Mellon Vehicular Information Technology and the Autonomous Driving Collaborative Research Labs. He also directs CMU's Real-Time and Multimedia Systems Lab. He has chaired multiple IEEE, ACM and SPIE conferences on cyber-physical systems, real-time systems, sensor networks and multimedia systems. Seven of his papers have received Best Paper Awards. He is a Fellow of the IEEE.

d) David Huber, President, Kairos Solutions [2:44—3:07pm]



Title: Data: Big, Better, Best---Fundamentals of Insurance Telematics

Abstract:

This talk will explore the why's & how's of the important of data for risk assessment & pricing, what insurers get from telematics, and the extra lift that comes from driving data. It will particularly discuss the benefits of considering large data sets in UBI as opposed to using small samples. Big Data opens up the possibility risk assessment at a micro level and also better characterization of the macro-level behavior leading to better understanding of business practices and opportunities. This talk will identify these gains by scalable Big Data Analytics and offer a review of the industry practices.

Bio:

Dave Huber is a seasoned Insurance Telematics expert and President of Kairos Solutions, a telematics strategy consulting firm that helps auto insurers and telematics service providers collaboratively bring cost-effective, innovative solutions to the US and EU marketplaces. Dave previously was VP of Telematics at GMAC Insurance and VP of Telematics & Innovation at AAA. He has led all aspects of the development, pilot, launch and rollout of a number of Usage-Based Insurance products for U.S. insurers, including Progressive's initial UBI program, TripSense. Dave serves as a Board Advisor at Maris, I Drive Safely, and Driveway Software. He believes today's offerings provide just a glimpse of the segmentation power, adoption rates and connected car technologies that will drive insurance telematics in the future. He earned an MS degree In Management from Georgia Institute of Technology and a BS in Mathematics from Clemson.

e) **Dr. Ed Cohen, Vice President, Measurement Innovation, Nielsen [3:07—3:30pm]**



Title: New Uses for Automotive Big Data: Understanding Consumers Better

Abstract: Nielsen will present thoughts on how OEMs, Tier 1s, carriers, and others involved in the entire connected car ecosystem can better understand consumer behavior in the car and what is desired in future vehicles. Two new studies will be previewed, one general market and one on millennials, offering insight on what consumers want in a connected car and where they are headed. The presentation will conclude with some new ideas for leveraging automotive big data to create value for multiple industries.

Bio:

Ed Cohen is Vice President-Measurement Innovation for Nielsen Audio based in Columbia, Maryland. In this role, Ed works in multiple research fields for the company including connected cars, streaming audio measurement, cross platform measurement, custom studies, mobile measurement, and other new initiatives. Prior to joining Nielsen Audio's predecessor, Arbitron, in 1999, he was Vice President-Research for Clear Channel Communications. He has also worked for WPXI-TV in Pittsburgh, Pennsylvania, Birch/Scarborough Research, the National Association of Broadcasters, and WSPA-FM in Spartanburg, South Carolina. Ed has taught at both Michigan State University and Duquesne University. Ed holds a Ph.D. in Mass Media and a B.A. in Telecommunication from Michigan State University and an M.B.A. from the University of South Carolina. He is former president of the Alumni Advisory Board for the College of Communication Arts and Sciences at Michigan State. Ed holds membership in a number of professional organizations and serves on the editorial board of the Journal of Radio and Audio Media.

f) **Group Discussion [3:30—3:45pm]**

9) **3:45—4:00 Coffee**

10) **Industry Sponsored Session [4:00—4:20pm]**

Venkat Rajan, SVP and GM, Symphony Analytics and S. R. Subramanian (Subbu), VP Analytic Technology, Symphony Analytics

Title: Big Data In The Driver's Seat: The New Era for Automotive.

Abstract:



It is no secret that telecom giants invested heavily over the past few decades in building robust communication infrastructure. It is also a brutal reality that all the profits that were to be made from these investments, today, are being snatched away by over-the-top (OTT) content and application providers. Auto manufacturers need to realize that it is not the connected car infrastructure that is going to realize profits, but connected car experience driven by smart Big Data applications is the game changer.

In this session, speakers will discuss a triad of strategic areas where auto manufacturers will need to invest today in Big Data and predictive analytics, to gain competitive advantage and secure tomorrow's profits.

- 1) For OEM PD and Service Activities: Cost containment, improved efficiency and competitive products.
- 2) For Improving Driver Experience: Self learning car for personalized driving experience.
- 3) For Improving the Consumer Experience: Understanding and engaging consumers in real-time in a "Segment of One" approach.

Bio of Dr. Venkat Rajan

As the General Manager of Symphony Analytics, Venkat is driving an exciting and high-growth area, leveraging a rich portfolio of solutions and services for Data Science and Big Data Analytics. Symphony Analytics has over 1,000 professionals with deep expertise in Analytics Strategy and Process Consulting, Big Data Technology Consulting and Implementation, Predictive Analytics and Data Mining. Venkat holds a Bachelor's degree in Mechanical Engineering from IIT, Madras, a Master's in Industrial and Management Engineering from Rensselaer Polytechnic Institute, and a Ph.D. in Industrial Engineering from Purdue University.

Bio S. R. Subramanian (Subbu)

Subbu is a recognized analytics engineering leader and has vast cross-industry experience in delivering commercial Big Data and predictive analytics solutions. He has been a strategic consultant to Fortune 50 enterprises on Big Data strategy and predictive analytics implementation. At Symphony Analytics, he leads the delivery of Automotive, M2M and Telematics. Subbu holds a Bachelor's degree in Electronics from REC Nagpur – India as well as a Master's in Electrical from IIT – Kanpur, India.

11) Analytics for Autonomous and Connected Vehicles: Technology and Infrastructure Issues [4:20—5:55pm]

Session Chair: Scott McCormick, President, Connected Vehicle Trade Association

a) Dr. Nick Maxemchuk, Professor of Electrical Engineering, Columbia University and IMDEA Networks [4:20—4:43pm]



Title: Safe Connected Vehicles: Reducing recalls and law suits

Abstract:

Our objective is to guarantee that vehicles that coordinate their operations will operate safely with all of the other vehicles, implemented by all of the other manufacturers, on the roadway. In 1984 the telephone network was opened to competition. Bell Labs was responsible for guaranteeing that the equipment connected to the network would interoperate with all of the other equipment in the network. We verified the interoperability of a large number of implementations by breaking the problem into two parts. 1) We proved that the protocols that define the interoperation of devices are unlikely to fail. And, 2) we developed a black box testing procedure to guarantee that a

particular implementation correctly implemented the protocol. In this way we avoided pairwise testing of a large number of implementations. We are applying the same strategy to testing the protocols that define the coordination of connected vehicles. However, the implementations are orders of magnitude more complicated than anything in the telephone network, time is a critical component in the interaction between vehicles, and the penalty for being wrong may be measured in the loss of human lives. We will describe an architecture that divides this complicated problem into more manageable pieces, and use synchronized clocks, made possible by GPS, to significantly reduce the number of possible execution sequences. Synchronized clocks have also resulted in a new class of fail-safe protocols, and have simplified the use of the conformance testing techniques that were used in the telephone network. We use these techniques to verify that our driver assisted protocol merge protocol will not cause an accident for combinations of mechanical failures, communications failures, interference by non-participating drivers, and unexpected obstructions in the roadway.

Bio:

Nicholas Maxemchuk, a networking pioneer, holds a permanent double appointment as Professor at the world-leading Columbia University of New York City (New York, USA) and Chief Researcher at IMDEA Networks.

He holds a M.Sc. in Electrical Engineering and a Ph.D. in Systems Engineering, both from the University of Pennsylvania (Philadelphia, USA). Before joining Columbia University and IMDEA Networks, Nick Maxemchuk held the position of Technical Leader at AT&T Research Laboratories (1996 – 2001) and, prior to that, was the Head of Distributed Systems Research Department at AT&T Bell Laboratories (1976 – 1996). From 1968 to 1976 he was a member of the technical staff at the RCA David Sarnoff Research Center in Princeton, New Jersey.

Many of his far-sighted contributions to computer-communications networking have been years ahead of their time and have led to the development of groundbreaking new systems. His invention of Dispersity Routing in the 1970s, for example, has recently been applied to ad hoc networks. In 2006, his achievements in the field were recognized by the world's leading professional association for the advancement of technology, the IEEE, when he was awarded the prestigious 2006 IEEE Koji Kobayashi Computers and Communications Award.

Amongst other awards that he has been given, some of the most noteworthy are the RCA Laboratories Outstanding Achievement Award in 1970, the Bell Laboratories Distinguished Technical Staff Award in 1984, the IEEE's Leonard G. Abraham Prize Paper Award in 1985 and 1987, and the William R. Bennett Prize Paper Award in 1997. He was also made a fellow of the IEEE in 1989, and received the 1996 R&D 100 award for his work on document marking.

As well as owning 30 patents and publishing three books, Nicholas Maxemchuk has co-authored over 100 publications. His strong reputation as an eminent scientist has earned him many editorial and advisory positions with organizations including the IEEE, ACM, NSF Expert Group

and the United Nations. He has published three award winning papers and had two of his publications voted into the Communication Society 50th Anniversary Issue. He is a member of the Board of Governors of the Armstrong Foundation and also works as a Consultant on Data Networks in Transportation Networks for The National Academies/Transportation Research Board.

- b) **Walton Fehr, Manager of Systems Engineering for the Intelligent Transportation System Joint Program Office (ITS JPO), US Department of Transportation and Gregory Krueger, Connected Vehicle Program Manager, Leidos [4:43—5:06pm]**

Title: A New Approach to Big Transportation Data

Abstract: The United States Department of Transportation (USDOT) has been researching connected vehicles for more than 10 years. This research includes the development and operation of a test bed facility in Southeast Michigan. USDOT has created a complete connected vehicle system architecture and implemented corresponding software at the Southeast Michigan Test Bed in order to manage the potential data flows through the Test Bed system and to support Peer-to-Peer IP Data Exchanges. The presenters will discuss the data features of the architecture and the big data tools and technologies that are being used to manage the early trickle of data that is coming into the Test Bed. This data is expected to grow significantly over the coming years through further testing and development. The presenters will also demonstrate the system and associated data exchanges and will provide information on upcoming activities to support the integration and testing of new participants in the Test Bed program.

Bio of Walton Fehr:



Walton Fehr has been the Manager of Systems Engineering for the Intelligent Transportation System Joint Program Office (ITS JPO) since May 2009. At the ITS JPO, Mr. Fehr leads the research into how the Connected Vehicle Core System will support applications for safety, mobility, and sustainability for all modes including passenger vehicles, transit, and heavy trucks.

Mr. Fehr is a graduate of the University of Illinois, where he earned master's degrees in electrical engineering and in business administration, as well as a bachelor's degree in electrical engineering. He is a licensed Professional Engineer, a certified Project Management Professional, named inventor on 22 US patents, and author of several papers.

Bio of Gregory Krueger:

Greg Krueger is the Connected Vehicle Program Manager for Leidos. He is presently the Manager of the US DOT Southeast Michigan Connected Vehicle Test Bed where he oversees the day-to-day operations and technology enhancements for the original Proof of Concept facility.

Greg is also leading SAICs efforts supporting UMTRI for the Safety Pilot Model Deployment effort in Ann Arbor and is supporting a variety of other Connected Vehicle programs for US DOT, Michigan DOT and AASHTO. Prior to joining SAIC, Greg served as Michigan Department of Transportation's (MDOT's) Program Manager for the statewide Intelligent Transportation Systems (ITS) program, overseeing all development, deployment, operations and maintenance of ITS throughout the State of Michigan. Krueger is the 2008 AASHTO President's Award recipient for Highway Traffic and Safety, the former chair of the ITS America IntelliDrive Task Force and is working within the TRB ITS Committee to develop a Connected Vehicle sub-committee, focused on documenting independent connected vehicle resources from around the country.



Mr. Krueger received his Bachelor of Science degree in Civil Engineering from Colorado State University and his Masters of Science degree in Civil Engineering, with an emphasis on Traffic Engineering from Texas A&M University.

- c) Dr. Dwayne Hencklewood, Associate, Booz Allen Hamilton [5:06—5:23pm]
Title: *Getting Ready to Capitalize on the Data Deluge of Connected Vehicles*

Abstract:

Next to the invention of the traffic signal, connected vehicle technology is positioned to be the single largest agent of change to the way the nation's surface transportation system is managed and operated. The promise of the connected vehicle technology is the large volume of the telematics data that will be generated, and transmitted through the network. This pending big data deluge of telematics data elements can and will support improved transportation safety and mobility, as well as reduce environmental impacts of the transportation system. However, to capitalize on this opportunity, a proper systematic/all-encompassing framework has to be in place to facilitate the inherent and integral interaction of the various participating entities in the connected world and stakeholders being served.

While the pace of discovery and development in big data is feverish, it is just on the horizon for Government sponsored surface transportation efforts. There is also now emerging a critical opportunity to be a step ahead of game to be prepared to take advantage of the big data by-product from connected vehicle and M2M technologies. This can be accomplished by closely exploring and conducting the requisite analyses for each of the three areas; policy, technology, and analytics. This analysis will create the structure of the framework with which we can realize the opportunities of the big data deluge that is to come.

Preparing agencies to capitalize on the imminent big data deluge is today's task. The following sections present a brief overview of the state of the practice, vis-a-vie the connected vehicle world, and looks at the likely volume of data that may be involved. From this, we will offer a snapshot of potential benefits of the connected vehicle data will then be provided, after which

the three challenge areas will be discussed and ideas presented as possible analyses to undertake in order to address these challenges – all in hopes of formulating the framework to support new generation of the transportation system.

d) **Andrew Hart, Head of Advanced Research Division, SBD [5:23—5:40pm]**

Title: *Big Data Monetisation: Where are the real opportunities and how can you capture them*



Abstract:

- i) With so many use cases floating around for Big Data monetisation, understand the difference between a great idea and a commercially viable idea
- ii) Big Data requires a Big Eco-system – learn how different OEMs are building their of eco-systems and what it means for their customers
- iii) Understand the changing legislative landscape that could hold back the automotive industry from tapping into the value of Big Data

Bio:

Andrew is a strong believer in the role that great market research can (and should) play in helping companies innovate. He is responsible for setting the direction of research within SBD, and ensuring that the key messages are clearly communicated to customers and the wider industry. Whilst originally from a mechanical engineering background, he now works tirelessly with customers and speaks passionately at conferences to encourage a change of mind-set within the automotive industry away from engineering-based solutions and towards consumer-centric innovations.

e) **Group Discussion [5:40—5:55pm]**

12) Closing Remarks. Dr. Hillol Kargupta, President, Agnik [5:55—6:00pm]