8:15am  Welcome Remarks  
Don Bari, Vice President, Chemicals Technology & Analytics, IHS Markit and Dr. Jeffrey S. Plotkin, Vice President of Training & Education, IHS Markit

8:30am  R&D Trends – The Arc of Petrochemical Industry Process Technology Evolution  
Dr. Jeffrey S. Plotkin, Vice President of Training & Education, IHS Markit
The petrochemical industry has been on a long, never ending journey of developing cheaper and cheaper process technology for manufacturing useful products from very basic raw materials. This cost efficiency march has not always been in a smooth straight line and has often involved baby steps, side-steps, back-tracks, stumbles and every once in while great leaps. This presentation is intended to briefly track this arc of petrochemical process development with an eye to setting the stage for our esteemed speakers participating in the technology seminar.

9:00am  Advantaged Technology and Application of Methanol to Fuel and Chemicals  
Dr. Kezhi Lin, Marketing Director, SEG (Sinopec Engineering Group)
Methanol is one of the most important chemicals. SEG can provide methanol to olefin and methanol to gasoline technologies with partners based on its advantages of more than 50 years engineering experiences on fluid bed technologies. SEG is open to cooperate with international partners to provide total solutions for clients.

9:30am  STAR Process® Technology – Advanced On-purpose Propylene Production  
Dr. Sascha Wenzel, Head of Sales Dehydrogenation, Thyssenkrupp Industrial Solutions
The STAR process® technology of Thyssenkrupp Industrial Solutions (TKIS) is used for the production of propylene and butylenes by dehydrogenation of propane (PDH) and butanes (BDH), respectively.
Especially propylene shows continuous growth driven by the demand for polypropylene (PP) and other derivatives. It is assumed that propylene production will increase from 100 to 120 million metric tons per year till 2022. In the same period the share of on-purpose technologies like PDH or metathesis will increase from approx. 15% to over 30% (Source: IHS Inc., 2013).
The STAR process® with a licensed capacity of more than 1.7 million tons per year is one of the leading on-purpose technologies.

10:00am  Question & Answer

10:15am  Break

10:30am  Advances in Oxidation Technology of Butene to Butadiene  
Dr. Xiankuan Zhang, Chief Scientist, SABIC

11:00am  Ethane in NGL Separation – to Reject or to Recover?  
Dr. R. J. Chang, Senior Global Managing Director, Process Economics Program, Oil, Mid-Downstream and Chemicals, IHS Markit
The competitive NGL-based feedstocks have spurred a new wave of investment in ethane-based ethylene production in North America, including seven expansion projects of existing crackers, six new steam crackers under construction, and eight crackers in feasibility stage. These new projects require additional ethane supply of about 11 million tons of ethane by 2018 and another 11.1 million tons beyond 2018 for the eight crackers in the feasibility stage. Whether the midstream companies will be able to meet this growing demand depends on pipeline availability, exports, and most importantly NGL separation and fractionation economics. This presentation examines the ethane separation economics to determine when a midstream company will reject ethane (including it with methane for fuel use) or recover it as a petrochemical feedstock to get an assessment of future supply-based techno-economics analysis.

11:30am  Cost-Efficient Methanol Production by Means of Topsoe Autothermal Reforming  
Dr. Esben Lauge Sorensen, Senior Technology Specialist, Haldor Topsoe
The leading methanol technology licensor Haldor Topsoe recently released a completely new route to methanol production. The new route eliminates the need for a steam reformer and thereby brings vast economic and operational benefits. The technology and its implications on project economics and implementation are presented.

12:00pm  Disruptive Technology in the Olefins Value Chain  
Andrea Redford, Vice President – Petrochemical Licensing, Siluria
Siluria Technologies is changing the way basic chemicals and fuels like ethylene, propylene, and gasoline can be made. The company’s natural gas fed catalytic processes are compatible with existing petrochemical and refinery infrastructure, translating to lower costs, feedstock flexibility, and superior scalability than steam cracking or other on-purpose routes.

(continued on next page)
12:30pm  Question & Answer
12:45pm  Lunch
1:45pm  The Dynamics of Global Plant Construction Location Factors
        Edward Glatzer, Managing Director, Technology and Analytics Group, Oil,
        Mid-Downstream and Chemicals, IHS Markit
        In discussions with IHS Markit clients in recent years, one of the topics that they bring up
        most frequently has been the rapid change in relative construction cost levels between
different locations. Much of this cost fluctuation can be attributed to recent wide swings of
exchange rates for most global currencies, but other factors such as labor rate changes,
are also impactful. In light of this, IHS Markit developed a methodology to independently
calculate and update our country location factors to reflect the ongoing reality in relative
capital costs and cost competitiveness.

2:15pm  New Cost-Effective Membrane Systems for Petrochemical Component Separation
        Dr. Hannah Murnen, VP Business Development, Compact Membrane Systems
        Compact Membrane Systems has developed a membrane that is highly effective at
separating olefins and paraffins. The membrane has advantageous performance
characteristics (flux and selectivity) and has demonstrated stability for >300 days. Use of
the membrane provides significant economic benefit over existing separation methods in
numerous petrochemical and refining applications.

2:45pm  Cost Competitive Single-Step Conversion of Fuel Grade Ethanol to Renewable
        Propylene (or Isobutylene) and Hydrogen
        Dr. Jonathan O. Smith, Director of Chemical Development, Gevo Inc.
        Gevo Inc., a Bio-Fuels company, has developed a novel robust mixed metal oxide catalyst
that selectively converts fuel grade/hydrous Ethanol to high purity Propylene in mass
yields of 37% (80% of theoretical) along with Hydrogen such that 10 million gallon per
year (30 KTA) ethanol provides 11 KTA propylene and 3.2 MM SCFD Hydrogen. Economic
sensitivities are discussed.

3:15pm  Design and Synthesis of a New Catalyst for the Polymerization of Propylene
        Dr. Jianjun Yi, Director, PetroChina Petrochemical Research Institute
        In the polypropylene industry, phthalate-based catalysts are used widely because of
their advantages in comprehensive performance. However, phthalates were found to be
potentially harmful for health. It is necessary to develop novel phthalate-free catalyst
with high activity and excellent stereoregularity. The new catalyst PSP-01 with new
structure sulfonyl compounds as electron donor, instead of phthalates, was successfully
synthesized and developed by our laboratory. The catalyst PSP-01 exhibits excellent
catalytic performance, and is commercialized. Series of polypropylene products with high
performance were developed, and used in the various walks of life.

3:45pm  Question & Answer
4:00pm  Break
4:15pm  Process Intensification in the Chemical Industry “You must unlearn what
        you have learned”
        Dr. Richard Charlesworth, Managing Director, Chemicals Consulting, IHS Markit
        Over the last 50 years, the pace of technological innovation in electronics and computing
has been phenomenal. The same cannot be said for the chemical industry that uses the
same basic process units albeit with improvements in capacities, catalysts and technology
routes. This presentation will review the concept of process intensification for chemical
plant, what process units could be intensified, the potential benefits, the barriers and the
current players in this area of innovation.

4:45pm  Syngas Fermentation Processes
        Don Bari, Vice President, Chemicals Technology & Analytics, IHS Markit
        Fermentation technology is being developed using microorganisms called acetogens
that have the ability to convert synthesis gas (syngas) components to multi-carbon
compounds such as ethanol, 2,3-butanediol, acetate, butyrate, butanol, and lactate.
Unlike conventional thermochemical processes, such acetogens do not require specific
H2:CO ratios for converting the gas into chemicals. This paper examines syngas
fermentation technologies, stage of development and their potential commercial scale
economics.