## Exhibitor Presentations

J. Jackman
Semi, Milpitas, United States

**Biography**
As Vice President of Finance and Administration, Jim Jackman is responsible for SEMI's accounting, HR, and IT functions worldwide. He has more than 20 years of progressively responsible experience in public accounting, financial reporting, accounting systems implementation, human resources, and financial planning and analysis. Prior to joining SEMI, he acquired vast experience at leading regional and global firms, including Gallina LLP, Octel Communications, Lucent Technologies, ATMI, and RoseRyan.
Jackman holds a BBA from California State University, Hayward, and has been a CPA in California since 1996.

## Simplifying your tool automation

D. Suerich
Product Evangelist
PEER Group, Kitchener, Canada

**Abstract**
Fabs are under continuous pressure to increase throughput, maximize yield, and reduce costs. These demands produce demanding equipment purchase specifications and place strict requirements on OEMs to provide more advanced automation and data management capabilities. Additionally, these requirements create an increasing burden on OEMs to provide best-in-class automation software to complement their process expertise. The best OEMs are making strategic decisions to ensure they can meet these factory needs efficiently today and in the future.

Join us as we discuss how you can streamline the delivery of your tool automation, allowing your engineers to focus on your core capabilities, while ensuring rapid deployment of SEMI standards-compliant equipment automation software, enabling fast fab acceptance of your tools.

**Biography**
Doug Suerich is Product Evangelist at The PEER Group Inc., the semiconductor industry's leading supplier of factory automation software for smart manufacturing and Industry 4.0. Doug focuses on big data and remote connectivity solutions that help manufacturers collaborate securely on tools and data in production environments. A passionate advocate for smart manufacturing, Doug serves as an active member of the SEMI® Smart Manufacturing Advisory Council and SEMI SMART Manufacturing Technology Community, Americas Chapter.

Doug has over 20 years of experience leading software teams for a variety of industries including semiconductor, manufacturing, and transportation. Most recently, he was involved in architecting PEER

Group’s remote connectivity solution, Remicus™, and he was a champion in promoting the use of cloud computing and latest-generation web technologies.

Prior to joining PEER Group, Doug was a software development manager, automation engineer, information systems specialist, and consultant. He has extensive experience designing and integrating robust automation software solutions. Doug holds a Bachelor of Applied Science with Honours in System Design Engineering from the University of Waterloo.

**Towards Research 4.0 - Automating R&D with Flextura PVD and Integrated Advanced Analytics**

C. Kjelde
International Sales
Polyteknik AS, PVD Systems, Oestervraa,
Denmark

**Abstract**
Polyteknik AS designs and manufactures sputtering and evaporation systems for industry and R&D. Here presenting a recent delivery of a state-of-art Flextura PVD cluster tool with in-system analysis for ambitious research within semiconducting oxides.
We aim at increasing R&D throughput, reliability, quality and record massive amounts of data for further interpretation. This is done by automating and coupling smart material-/process development with in-system characterisation. With other words we are looking into RESEARCH 4.0!

**Biography**
Christian holds a M.Sc Eng. in Nanomaterials from Aalborg University and is responsible for sales of PVD systems at Polyteknk AS.This includes a strong impact to the development of processes and solutions for customers working in a diversified area of business fields covering semicon, mems, optoelectronics, sensors, RF, EMI etc. Furtmore the customer pallette of Polyteknik AS is ranging from volume production to almost fundamental research. A strong team of colleages has succeded in transfering customer input to a robust platform which is able to bridge R&D and production in a seldom seen manner.

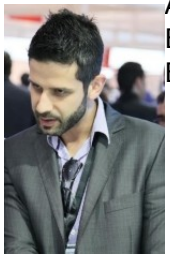
**Moisture and AMC reduction**

J. Lundgren
Field Application Engineer, Sr
Entegris GmbH, Dresden, Germany

**Abstract**
§As semiconductor line widths continue to shrink below 20nm and packaging technologies continue to advance, controlling yield is becoming increasingly more complex
§One of the key contributors to yield loss is the presence of residual moisture which acts as a catalyst for corrosion
§AMC and corrosive effects of moisture can be seen both within the fabrication process and in the post-fab shipping/packaging process
§Entegris' Ultrapak and Crystalpak multi-wafer shippers are used for storage and shipment of semi-finished and finished wafers à methods for controlling moisture is key and an evolving area of interest for Entegris
§300mm FOUP purge using XCDA and or N2 to remove AMC and moisture

**Biography**
Jorgen Lundgren
Senior Applications Engineer Entegris

**Measurement of oversize particles in the CMP process.**



A. Pantazis
EMEA Sales Consultant
Entegris, Athens, Greece

**Abstract**
Chemical Mechanical Polishing/Planarization (CMP) is a process widely used in the microelectronic industries to smooth surfaces with the combination of chemical and mechanical forces. The particle size distribution of the slurry is a critical parameter controlling the success of the planarization process. A few large particles can scratch the surface of wafers or disc drives, reducing yields and profits.
Single particle optical sizing (SPOS) technology measures the particles one at a time as they pass through a narrow measurement chamber, providing both an accurate size and concentration (particles/mL) result. Since the particles are measured individually, this technique is inherently very high resolution, and can detect even very few individual particles removed from the main distribution. It is therefore the ideal technique for detecting the Large Particle Counts (LPCs) that cause the most trouble with CMP slurries.

**Biography**
Antonis Pantazis is currently working as Sales Consultant managing the sales in EMEA region for Entegris Particle Sizing Equipment.
Antonis obtained a BENG in Computer Systems Engineering from the University of Sussex in 2003 and a Masters Degree (MSc) in Telecommunications from University College London in 2005.
He has worked for more than 10 years as a Systems Engineer, product specialist and Sales Manager positions in a variety of companies in the fields of Telecommunications, IT and Test and Measurement.
Currently Antonis is working as a Sales Consultant for Entegris Inc. managing the Particle Sizing Equipment Sales and Support in Europe, Middle East and Africa regions.

**Sub-Angström controlled Sputtering Process for Magnetic Sensor**

B. Ocker
Head of Business Unit Semiconductor NDT
Singulus Technologies AG, Business Unit
Semiconductor NDT, Kahl am Main, Germany

**Abstract**
Over a long period the Hall sensor dominated the magnetic field measurement. In the last years more advanced magnetic sensors are under development for consumer, industrial and automobile applications. The magnetic sensors, which are using the Tunnel Magnetic Junctions, are showing the highest resitance change with a TMR of ~ 250%. For this technology it is essential to controll the film layer thickness in a sub Anström level. Singulus developed a production technology which shows a high repeatability and an excellent uniformity for a substrate size of 200 or 300 mm.

**Biography**
**Berthold Ocker** studied physics at the Johann-Wolgang-Goethe University in Frankfurt and has more than 25 year experience in the vaccum deposition technology. He started his carreer 1991 at Leybold and leaded since 2001 the R&D activitivies for spintronic apllications. Since 2015 he took over the responsiblity of the Business Unit Semiconductor NDT. He is author and co-author of more than 50 scientific articles.

# ULVAC solutions for new MEMS devicesULVAC solutions for new MEMS devices

Y. Yamazaki
ULVAC, Munich, Germany

**Abstract**
As for MEMS applications, we show ULVAC`s PZT sputtering and etching processes. We also share Bio MEMS application by glass etching

**Biography**
Yoshifumi Yamazaki joined ULVAC, Inc, in 1990. Involved with semiconductor systems especially dry etcher, and ion implanter. Moved to ULVAC GmbH in 2018, as a Technical sales manager in Europe

**Carrier Wafers for thin wafer handling using temporary bonding technologies**

C. Wesselkamp
Sales Manager
Plan Optik AG, Sales, Elsoff, Germany

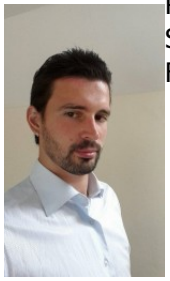
**Abstract**
Microelectromechanical systems (MEMS) and Sensors provide the magic that makes today's devices from our everyday life smart. MEMS consist of tiny mechanical and electrical devices such as membranes, mirrors and valves, as well as sensors, actuators and integrated circuits. Without MEMS or sensors, we would not have smartphones, smart homes and wearable smart watches, as well as a huge range of industrial and medical devices that require the functionality provided by MEMS and sensors.
Smaller package sizes require extremely thin substrates to build up devices. For this thin and ultra-thin substrates need to be processed, that put new challenges on handling them throughout the process. For this carrier wafers are used, that support the thin device wafer during processing.
Temporary bonding and de-bonding is used to fix the device wafer onto the carrier prior to processing and releasing it afterwards. There are different bonding and de-bonding technologies available, that require different material properties as well as patterns and features.
Glass and quartz are excellent materials for carrier wafers because of their thermal stability and resistance against acids and other chemicals. Bonding to and de-bonding from glass and quartz carrier wafers can be monitored since they are transparent. Furthermore, glass carrier wafers can be cleaned and re-used, thus contributing to cost reduction and environmental protection.
This presentation shows possibilities for using Carriers from Glass and Quartz with different bonding and de-bonding technologies as laser, chemical or thermal release.

**Biography**
Mr. Carsten Wesselkamp got a degree in Industrial Engineering with a study emphasis on operating technology and production engineering in 1995. He additionally achieved a certifcate in work system and process organization by REFA (organization for work study and company organization).

After working as assistant production manager for a multinational steel and aluminum producer he joined Plan Optik AG, one of the leading manufacturers of wafers for MEMS and carriers for semiconductor applications in 1996 as one of their sales engineers.

Since many years, Mr. Wesselkamp acts as the international sales manager of Plan Optik AG and (together with his team) manages the accounts of Plan Optik AG including all technical and commercial tasks.

## Two-photon absorption in semiconductors design and manufacturing



P. Naujalis
Sales Manager
Fyla laser, Valencia, Spain

**Abstract**
Two-Photon absorption technique for semiconductors and circuits inspection allows precise voxel analysis in semiconductors, wafers or circuits. High flexibility new fiber laser design allows to reduce costs from existing techniques and increases flexibility in measurement capabilities.

**Biography**
Experienced Sales Manager/Applications Specialist with a demonstrated history of working in the photonics industry. Skilled in Relationship management, commercial department management, design and development of photonics solutions and Research and Development (R&D). Strong engineering and commercial professional with a Master in Physics, Diploma in Engineering and Certificates in Business Management.

## Line Confocal Sensors for Industrial Inspection

M. Deveci
Sales Manager
FocalSpec Ltd, Espoo, Finland

**Abstract**
Line Confocal Imaging (LCI) is an optical technology for high speed 2D and 3D topography and tomography measurements.

Line Confocal Imaging sensors measure millions of accurate data points per second, also from moving surfaces. The LCI sensors provide sub-micron resolution and can be used for all kind of surface types, including glossy, curved and transparent materials that have been challenging for industry standard laser sensors. Simultaneously with the 3D data, the LCI sensors produce also high dynamic range pixel synchronised intensity images of the surface which can be used to 2D defect detection and pattern recognition.

The applications of LCI sensors include roughness measurement of transparent surfaces, defect detection in multilayer transparent materials, high speed dimensional control of 3D curved glasses, various surface and sub-surface analysis of flexible, hybrid, and organic electronics, BGAs, MEMS.

The LCI sensors can be integrated to factory automation using Ethernet interface.

In this talk, the LCI will be explained in detail and several industrial applications will be given as examples.

Keywords: optical 3D sensors; surface metrology; film tomography, high-speed in-line inspection; submicron

**Biography**
Murat Deveci is responsible for market development and sales operations in Europe, the Middle East, and Africa as a sales manager. He has been working in sales and marketing of advanced metrology systems since 2012 within different companies. He holds a Master of Science degree in Materials Engineering from the Tampere University of Finland.

## UV Cure – an Enabling Process Technology for Efficient Thick Photoresist Drying

C. Schaefer
Trymax-semiconductor, Nijmegen, Netherlands

**Abstract**
Completely dried photoresists (“PR”) masks are a necessary precondition to avoid undesired effects in subsequent manufacturing steps like high dose implant, metal/oxide etch and ash. But in particular for medium or thick PR commonly used in Power Device, MEMS or Advanced Packaging (TSV) this becomes increasingly difficult using just the standard thermal hard bake.
A solution for achieving crosslinked PR films is the so-called UV Cure - a state-of-the-art technology combining UV exposure with precise low-high-low temperature cycling. This leads to 100% deep dried PR films due to crosslinking of the resin and the photo active compounds by UV radiation and thereby efficient solvent evaporation.
The presentation will explain above physical-chemical phenomena, show the effects in key applications and will further explain the Trymax NEO 2000UV system requirements and features

**Biography**
Christian Schaefer is since January 2016 Sales Director North Europe for Trymax Semiconductor Equipment, the Netherlands. He has a MS in Process Engineering and a PhD in Material Science - both of the Technical University of Aachen, Germany. Before he joined Trymax he held positions in the semi equipment industry as BU Manager at PVA TePla AG in Munich (10y), as VP Sales & Board Member at EV Group in Austria (7y) and as Product Group and General Manager at Leybold Systems in Hanau, Germany (14y).

**3D Automatic X-Ray Inspection System**

Y. Y. Jung
CEO
Nanotech Digital GmbH (SEC Europe Head Office),
Manage & Marketing, Dresden, Germany

**Abstract**
**TOPIC:**
3D X-ray Inspection for defects in Multi Layers for the Mass production application of IC, PCB, PCBA, BGA, etc.

**Motivation:**
What is 3D AXI? It uses X-rays as its source to automatically inspect features, which are typically hidden from optical view. 3D AXI is automatically inspects the defects of products in customer's line with high-speed 3D CT tomography.
Able to inspect every defect of double-sided PCBA & BGA mounted components precisely by solving overlapped X-ray image issue. Inspection speed of 4.5 sec/FOV from loading to automatic Good/NG judgement.

**Description:**
• X-Ray Tube; 160kV/500uA
• Min. Resolution; 0.8~15 um
• Table Size; Max.330x250mm, Min 50x50mm
• Detector; 12inch FPXD
• Inspection Object; BGA, Though Hole, Chip, QFN, QFP, PoP, connector, Components
• Equipment Dimension; 1,360(W) x 1,880(D) x 1,700(H)/ 4,200Kg

**Innovation:**
• World Fastest speed 3D In-Line Inspection
• Hybrid Open Tube;
- realize Best resolution of 0.8um Focal spot
- realize Pulse beam and it remove CT afterimage
- reduce radiation damage
- realize long life span for in-line purpose
• Best Solution for both-side layered PCB**(HIP:Head in Pilaw)**

**Results:**
Cover AVI Inspection limit **-> Multi-Layer Inspection**
Shorten 3D Inspection Time; 4.0 sec/FOV **-> High Speed Inspection for Mass production**
Reduction of radiation damage; Max. 1/100 **-> Damage Free**
Tube life span; 10,000hrs/Filament **-> Long Life Maintenance**

**Biography**
The founder/CEO of the company has a Master's Degree in semiconductor and display engineering as well as an AICPA MBA degree.

He has worked as an semiconductor & display mass production equipment engineer. He has extensive knowledge in the thin film process, and equipment process.
With his expertise in various display and semiconductor equipment process, he established

“Nanotech Digital GmbH,” to develop various Roll to roll CVD graphene and applied graphene technology products, semiconductor equipment & components.

Also he has worked as an general manager of 'SEC Co.,Ltd'
'SEC Co.,Ltd' is the best inspection system company developing industrial X-ray inspection , SEM(Scanning Electron Microscope) and linear accelerator technology.
SEC is specialized in 2D & 3D automatic X-ray inspection for semiconductor packaging, PCB, electronic components.

# Semiconductor Smart Manufacturing: An Evolving Nexus of Business Drivers, Technologies, and Standards

A. Weber
VP, New Product Innovations
Cimetrix Incorporated, Marketing, Salt Lake City, United States

**Abstract**
The semiconductor industry embarked on its own “Smart Manufacturing” journey over 30 years ago, long before the term was coined. The continuous productivity improvements that result are absolutely essential for creating and building the devices that fuel our electronics-based global economy and maintaining commercial viability in a hyper-competitive industry. However, what we’ve learned in the process is that like many scientific endeavors, it is a journey without a destination… as new market opportunities are met with new device and system technologies in an ever-changing business environment, the list of manufacturing challenges is never complete.

How, then, can one plot a course under such conditions? What intermediate destinations should we choose, and for what reasons? How should we prioritize the allocation of limited resources, both capital and human? How do we gauge our progress in a given area, and know when to move on?

This is where the global Smart Manufacturing initiative (synonymous with the Industry 4.0 efforts in Europe) enters the picture. Although its key tenets are not specific to the semiconductor industry, the attention it drew to this topic triggered the formation of a SEMI Smart Manufacturing Council, which now provides a forum for thought leaders across our value chain to address these important questions.

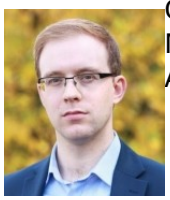
This presentation first summarizes the range of business drivers (and associated metrics) considered by the industry as expressed in the recent survey distributed by the SEMI Smart Manufacturing Council rather than focusing on a specific problem area. It then identifies a number of the solution technologies that could address the manufacturing challenges derived from the key business drivers. Finally it describes the role that standards (current and yet-to-be-defined) can play in enabling the effective deployment of solutions in a production environment.

**Biography**
Alan Weber is currently the Vice President, New Product Innovations for Cimetrix Incorporated. Previously he served on the Board of Directors for eight years before joining the company as a full-time employee in 2011.

Alan's experience includes: semiconductor design automation, equipment and factory control system architectures, Advanced Process Control (APC) and other key semiconductor manufacturing applications, SEMI Information and Control standards, especially GEM300, EDA/Interface A, and SMT-ELS.

Alan has been a part of the semiconductor and manufacturing automation industries for over 40 years. He holds bachelor’s and master’s degrees in Electrical Engineering from Rice University.

## Novel Group IV Epitaxial Materials



G. Colston
Managing Director and founder
AdvancedEPI, Stoneleigh, United Kingdom

**Abstract**
Advanced Epi supplies and can develop processes for all Group IV semiconductors with capabilities across epitaxial growth, in-depth material characterisation and device fabrication. This talk will cover a number of different materials, their properties and applications from Group IV, focussing primarily on cubic silicon carbide (3C-SiC) and germanium tin (GeSn) alloys which can both be grown on silicon wafers and integrated into silicon processing. These novel materials each have the capability to revolutionise the field of semiconductors across power electronics, sensing, light emission and mobile communications to name but a few.

**Biography**
Dr Gerard Colston is the Managing Director and founder of Advanced Epi Materials and Devices Ltd a UK based company offering epitaxial services across Group IV semiconductors. Dr Colston completed his PhD in cubic silicon carbide growth technology and has researched other semiconductor materials including various Si alloys, Ge, GeSn and SiC throughout his professional and academic career.