Fab productivity (TechARENA)

M. Arnold
Managing Director
PEER Group GmbH, Dresden, Germany

Biography
Dr. Michael Arnold has been responsible for overseeing PEER Group´s European operations since the inception of the German office in 2003. As a hands-on leader, Michael is the account manager for several of PEER Group's top customers. He has served as a member of the SEMICON Europe technical program committee since 2009. Prior to joining PEER Group, Michael was the operations manager of TRW's European Manufacturing Solution Business Unit in Dresden, Germany. Before this he worked for a variety of companies, developing product software solutions and implementing industrial vision systems and factory automation solutions for European productions sites. Michael holds a Diploma degree in Physics and a Ph.D. from the Friedrich-Schiller University Jena.

Automation as Key Enabler for Productivity Increase

J. Sturm
Productivity Management Frontend
Infineon Technologies AG, Neubiberg, Germany

Abstract
The levers for productivity increase of mainly depreciated fabs are limited. One of the most important levers is automation, not only material handling and transport automation, but also automation of so-called "side activities" as tool checks and exception handling.
The presentation focusses on automation besides robots and transport systems and gives some examples on how it can be added to mature fabs resulting in better cost position, better quality and less cycle time.

CV of presenting author
Physics Diploma at RWTH Aachen in 1991 Dr. rer. nat. at RWTH Aachen in 1993 Several positions at research institutes and companies including TU Berlin and Mühlbauer International, Roding 1998 until 2014 Manager at Infineon Technologies Dresden in different areas, e.g. Burn In, Furnace, WET, Communication and Automation Since 2014 at Infineon Technologies AG, Neubiberg, responsible for Frontend Productivity Management and Automation

Improving manufacturing efficiency thanks to collaborative European projects

F. Finck
Director, R&D Cooperative Programs
STMicroelectronics, Technology R&D, Crolles, France

Abstract
ST Crolles 300mm manufacturing line is both facing the problems of developing industrializing More Moore and More than Moore technologies which
demands high flexibility to manage a high diversity of technologies and products.

To maintain its competitiveness ST Crolles must efficiently manage a high product and technology mix and heterogeneous lots of different size and priority for development, engineering and prototyping. This implies to conduct research to support the development of new manufacturing procedures, organizations and information and control systems (FICS) and their implementation without disrupting the Crolles Fab-lab environment.

The ENIAC project INTEGRATE is gathering a strong consortium of European SC manufacturers, solution providers and academics that are bringing their complementary skills and experience to address these challenges. INTEGRATE consortium is considering the development of enhanced integrated process control and equipment control tools, together with advanced lot flow control techniques.
The developed tools and methods will have to interact with lower and upper decisions levels and also consider various elements of the fab (tool status, auxiliary resources, qualifications, etc). Mandatory to enable the integration of the developed tools and techniques, dynamic knowledge management methodologies are also addressed in INTEGRATE.

CV of presenting author
François Finck, aged 59, is an engineer in semi-conductor physics from the Institut Polytechnique de Grenoble. He is currently R&D Cooperative Programs Director at STMicroelectronics in Crolles. He is leading many R&D collaborative projects especially in the domain of manufacturing sciences. He has an experience of more than 35 years in Device Engineering, Yield Management and Statistical Data analysis.

Energy Efficiency in Semiconductor Manufacturing - Tool and Fab Aspects

R. Oechsner
Head Section Energy Technology
Fraunhofer IISB, Energy Technology, Erlangen, Germany

Abstract
Due to continuous rising energy costs, energy efficiency in semiconductor manufacturing is a key issue. Main energy consumers are the fab infrastructure as well as tools in idle mode or running processes. In this presentation, both areas will be covered: how can tools run more efficient and what energy concepts are applicable and possible. An overview of the energy consumption and potential areas for energy reduction in a semiconductor manufacturing fab will be presented. Finally, examples for energy saving potentials on tools level (diffusion furnaces) and on fab level (waste gas usage) will be discussed.

CV of presenting author
Richard Öchsner received the M.S. (Dipl.-Ing.) degree in Electrical Engineering and the Dr.-Ing. degree from the University of Erlangen. Since 1991 he is with Fraunhofer IISB and working in the department Semiconductor Manufacturing Equipment and Methods as deputy head of department and leads the group

Manufacturing Control and Productivity. He was engaged in the fields of semiconductor equipment assessment, contamination control in equip-ment, equipment control, integrated metrology, advanced process control, manufacturing methods, optimization, productivity and energy efficiency. Since 2012 he is head of section energy technology and working on energy concepts covering creation, storage, distribution and efficient use of energy. Richard Öchsner was/is involved in several European and national co-operative R&D projects also as coordinator. He was active in SEMI standardization and a member of the Factory Integration TWG within ITRS (International Technology Roadmap for Semiconductors).

Integrated sub-fab equipment solutions - the key to manufacturing peace of mind

A. Chambers
Global Product Marketing Manager - Integrated Systems
Edwards, Crawley, United Kingdom

Abstract
Cost-effective manufacturing of future 10-nm and 7-nm devices in HVM will require control and continuous reduction of total operational costs, excellent process stability, well-defined equipment finger-printing processes and high equipment reliability. Sub-fab equipment required to support process tools in an HVM environment is critical to satisfying these requirements.
Historically, the major process tool support elements located in the sub-fab (pumps, scrubbers, chillers, etc) are installed, commissioned and operated as a collection of discrete components. Edwards has been able to demonstrate that integration of sub-fab components into a single unit, with a single controller, provides better process reliability, safer operation, faster start-up and reduced total cost-of-ownership.
Integrated sub-fab systems provide several operational and cost benefits. An integrated system supplier is able to define and control the best possible set-up of vacuum pumps, abatement system, exhaust pipe configuration and pipe temperature management to provide reliable and predictable performance. Servicing of the individual elements of the integrated system can be coordinated to avoid unnecessary down-time.
A second benefit of integrated sub-fab systems is that installation time and cost are significantly reduced - utilities are distributed within the system minimising the number of external connections. The system can be tested prior to delivery, reducing the time required to put the equipment in service once it has been installed.
Integrated systems provide risk mitigation features that improve operational safety; for example, a secondary enclosure around the vacuum pumps, exhaust pipes and abatement unit reduces the risks of process gas leakage from elements in the system.
Considering these and other advantages, it is anticipated that integration of sub-fab equipment will become an indispensable aid to enhancing process operation and reducing total cost of ownership in HVM.

CV of presenting author
Andrew Chambers is Global Product Marketing Manager for Integrated Systems at Edwards Ltd. He is responsible for commercialisation and product management of integrated vacuum and abatement solutions, which deliver industry leading operational efficiencies and low total cost of ownership. He has also served as Technical Manager for Edwards' Exhaust Gas Management Division, where he managed engineering and R&D activities for the semiconductor, flat panel and compound semiconductor business segments. With over 34 years working in the semiconductor industry Andrew has extensive applications experience, having held technical and managerial roles at several process tool and sub-fab equipment OEM companies, including Tokyo Electron Europe Ltd, Surface Technology Systems, Electrotech Group, Lasa Inc. and Oxford Instruments Plasma Technology.

Increasing fab productivity in mask shops

M. Kaoui
Application Engineer
Rudolph Technologies, Mainz, Germany

Abstract
Mask shop productivity is strongly influenced by the 100% outgoing defect inspection of manufactured reticles by using reticle inspection tools.
These highly sensitive tools with a throughput of 1-2 h are also used for incoming mask blank inspection as well as for production tool monitoring by using monitor mask blanks.

During the inspection of mask blanks reticle inspection tools cannot be used for reticle inspection thus reducing the output of the factory.
We are presenting a high throughput low COO mask blank inspection technology that can take the load of bare mask inspection off the reticle inspection tool and thus increase fab productivity significantly.

CV of presenting author
Mounir Kaoui has a Physics Diploma at Johannes Gutenberg University Mainz in 2011. He join Rudolph technologies 2012 as an Application Engineer. Mounir works closely with equipment and process engineers at major semiconductor fabs and mask shops. His extensive expertise includes collaborating on evaluations and providing customized solution, technical support and training for defect inspection tools that are used for bare wafer and Mask blank inspection.

Minienvironments: flexible solutions

M. Dobler
Sales Manager
MCRT GmbH, Heuchelheim, Germany

Abstract
Minienvironments are localized solutions to generate a defined surrounding for a given process. This could be related to cleanliness, but could also include temperature and humidity control or special atmospheric conditions for sensitive materials. How a minienvironment is designed and build depends on the specific requirements of the process and the given surrounding. Based on the increasing degree of automation the concept of the minienvironments is widely used in semiconductor manufacturing and becomes more and more important as enabling technology for future developments like 450 mm wafers, EUV lithography and organic materials.

CV of presenting author
Maximilian Dobler: Short Biography

Born:

13.04.1967, Munich, Germany

University:

1994 Degree in Physics, Ludwig-Maximilian-University, Munich, Germany

PhD-Thesis:

1994 - 1998, Research Centre Dresden (Germany), Institute of Ion Beam Physics and Material Sciences, subject: silcide formation and charaterisation, 1998 Degree from Technical University Dresden

Post Doctoral Position:

1998 - 1999, Research Centre Dresden (Germany), Institute of Ion Beam Physics and Material Sciences, subject: semiconductor material characterisation

Atomika Instruments GmbH (Munich, Germany):

1999 - 2000, Application Engineer, subject: trace contamination measurements with TXRF (Total reflection X-Ray Fluorescence Spectroscopy)

Leica Microsystems Semiconductor GmbH (Wetzlar, Germany):

2001 - 2002, Application Engineer, subject: optical thin film measurement and characterisation with spectral photometry and ellipsometry

2002 - 2008, Product Manager, subject: optical inspection and review systems

MCRT (Micro CleanRoom Technology) GmbH (Giessen, Germany):

2009 - today, Sales Manager, subject: cleanroom and minienvironment solutions

Reduced Utilities Consumption for Single Wafer Clean by using Point-of-Use Scrubber

J. Cavaillier
Key Account Manager
DAS Environmental Expert GmbH, Dresden, Germany

Abstract
In the field of waste gas treatment it is well-established practice to treat exhaust air from wet-chemical processes in semiconductor manufacturing with central wet-scrubbers or, if loaded with VOCs, with central thermal oxidizers. Nevertheless, with single-wafer wet-cleaning tools coming into mass production local wet-scrubbers have advantages. They replace switching boxes, which direct the exhaust air - depending on actual process conditions - to the different central systems. The challenge in the design of a local scrubber for this application was a trade-off to meet the specific restrictions concerning size, efficiency and pressure drop. The point-of-use concept by DAS Environmental Expert was successfully evaluated for this application. The advantages compared to the switching-box concept are smaller and less complex exhaust-piping, smaller load to central treatment systems, reduced loss of clean room air, smaller footprint and higher flexibility for process changes. Low emission concentrations are achieved and salt particle formation from acids and bases is eliminated. Such a concept is described in this presentation.

CV of presenting author
Juliette Cavaillier is Key Account Manager for the Gas Treatment Product Line at DAS Environmental Expert GmbH. She holds a degree in Economics and Business Administration from Paris-Dauphine University and Louis Pasteur (Strasbourg I) University. Juliette first joined DAS in 1996. She gathered many years of international sales and business development experience in the semiconductor industry as Sales Manager for customers in Europe, Asia and the U.S.

Advances in plasma etch & deposition solutions for R&D and production

P. Parrens
Director, Corial SAS

Corial SAS, Grenoble, France

Abstract
The drive for fast track development and implementation of new processes in production of MEMS, LED, and general compound semiconductor or optoelectronics processing calls for plasma processing tools with built in flexibility and reactor technology for easy scale up as production volumes or substrate sizes increase.

Key features of Corial ICP-CVD, PECVD , RIE and ICP-RIE tools that deliver precise, repeatable processes using robust, low maintenance reactor designs will be explained. Easy handling of multiple substrate sizes & process chemistries with flexible software for process set up, monitoring & control simplifies the transition from R&D process development up to large reactor sizes for production.

CV of presenting author
Pierre Parrens is a physicist, graduating first from INSA Toulouse in 1972 and subsequently from the Joseph Fourier University in Grenoble "(Diploma in Nuclear Engineering 1973). He worked for 8 years at LETI as head of research in microlithography (e-beam, X-rays, optical) where he developed the technique of RIE plasma etching . In 1983, he founded and managed "Nextral" , specialists in the development and commercialisation of machines and processes for plasma deposition and etch. Since 2005 he has been Director of the company Corial. In 2003 he was awarded "Chaptal de la Physique", a national distinction given by the French Society for the Encouragement of Industry.

An Agile Approach to Automation Software for Tool Control

W. Schmalz
Director, Global OEM Sales
PEER Group, Kitchener, Canada

Abstract
As fabs strive for more productive manufacturing processes, OEMs are forced to become more agile in the deployment of their tools. In the old paradigm of tool automation and control development, this requirement for agility causes tension between cost-effective tool development and long-term maintainability. We are presenting our suite of off-the-shelf tool automation development products architected specifically for the semiconductor tool maker to enable agility and cost-effective maintainability. Using our products, OEMs can meet the fab's needs for productive manufacturing, while reducing turnaround times, time to market, and cost of ownership. Learn how PEER Group's product team has designed our OEM product suite to help tool builders become more agile and cost effective at developing and supporting next-generation tool development.

CV of presenting author
PEER Group provides factory automation software solutions and consulting services to wafer fabs, assembly plants, and equipment suppliers, facilitating the fastest time to market at the lowest cost of ownership in the semiconductor industry. As Director, Global OEM Sales, Bill leads PEER Group's global OEM sales and distribution organization across North America, Europe, and Asia. Since joining The PEER Group Inc. in 2002, Bill has been instrumental in building the company's software product and services position in the semiconductor equipment manufacturer (OEM) market. He helped drive a new cost effective perspective on the way OEMs looked at developing automation software, creating a new business area for PEER Group in equipment automation software.

Real HEROs: Latest developments for Automated Carrier Handling

B. Stegemann
Sales Director
HAP GmbH Dresden, Dresden, Germany

Abstract
The big majority of European chip fabs still uses wafer sizes of 200mm and smaller. And most of these fabs are older and grew over many years. Hence, automation, especially hardware automation, is a challenging task, as this was not planed when these fabs were built.

HAP GmbH Dresden has been offering Automated Carrier Handling (ACH) solutions for many years. The current standard system is the HAP-HERO®, which is rail based and requires straight lines of loadports. As many of the European fabs do not have these straight lines of equipment, but small and warped aisles, it is essential to offer a manoeuvrable, small system that can cope with this infrastructure. Therefore, HAP is developing the HAP-HERO® FAB. This new system can move and navigate freely in the cleanroom. No rail or cable are needed, anymore. The required minimum aisle width is less than 1 meter. Its on-board 6-axes robot can load all kind of carriers and the system could be used for the local transport as well.

CV of presenting author
Born in 1969, Burkhard Stegemann studied Physical Technics at the FH Aachen and completed his final year at Coventry University, resulting in a BSc in Applied Physics and a Dipl.-Ing. (FH) in Physikalische Technik.
In 1996 he joined Carl Zeiss in Jena in the department of microscopic wafer inspection. After two years in R&D/ application, he changed to product and project management.
As part of the acquisition of the Zeiss business field "optical wafer inspection" by HSEB Dresden GmbH in 2004, Burkhard Stegemann became sales director and in 2007 managing director of HSEB. His responsibilities were sales and service.
In May 2014 he started at HAP GmbH Dresden as sales director.