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**Education:**

Physics diploma University Regensburg,  
Thesis: "FIR photoconductance spectroscopy on InP"

**Current Activities (IMS Stuttgart)**

- Development of Ni-etch processes on Si-wafers (Projekt :Senate)
- Development of Plasma etch processes for GaN-technology
- Evaluation of new microstructuring technologies for optical systems
- Development of stable PVD deposition process of ultrathin Cr-layers and Al/Cr sandwich structures –
- Consultancy Project: Die-Bonding of flexible Si chips (20-30um ) on flexible PCB
- Development of stress free Cr- and Ti layers on stencil masks and mask blanks for optical industry.

**From August 1998 also in charge of hermetic seal & assembly for prototypes from our IC-production. , CECC certificate 1999.**

Managing assembly projects with customers from space&defense and optical industry (2004-...)  
Aquisition of all new assembly & packaging equipment: (Die- & Wire-Bonder, vacuum solder oven, Disco back grinding, dicing & lapping equipment (Taiko-process), test equipment.  
In charge of upgrading and modernising equipment (PVD- and thermal/e-beam vapour deposition equipment).

Project: Development of new methods for void free soldering, lead free and flux free (Au/Sn, Ag/Sn)

Project: Evaluation of reactive nanofoil stacks for soldering

Project: Dispensing of extremely thin glue layers with jet technique.

Project : Plasma etch process for Al on BCB layers

Project : Modernising clean room facility for assembly & packaging: Changing flow boxes with a larger clean room tent, to gain more space for handling camera & mask products. (2015)

Project : Stable automated high precision ( $\mu\text{m}$ ) adjustment of silicon stencil masks to stainless steel carriers on automated Die-Bonder (FAB1 by Amadyne). (2015-2016):

Project : Evaluation of equipment & process development (2016)

Project : Pronto-Project R2R (reel2reel production of von MID-Microsystems), sub project owner:  
Through hole contacts (TSV) of serial product camera sensors (power & signal lines to sensor backside) (2011-2014)

Project : FlexPacFam (development of cost reducing packaging for asics and camera sensors) (2013-2015)

Project : Deposition of thin Pt layers for fuel cell applications. (2014-...)

**Activities within newly founded „Add On“ department bringing together chips and non CMOS materials for post process customising and modifications (2011-2015):**

Projects: Plasma processes (etch, deposition), characterisation, test structures ;

Aquisition of new plasma etch equipment (Oxford Instruments), Installation, process development and replacement of resist stripper with equipment from Nordson March.

Project: Development of dry resist process (lamination, lithography, dry etch and resist stripping)

**Activities for 0.5  $\mu\text{m}$  CMOS prototyping line (2005-2015):**

In charge of process development deposition and etch of metallisation layers, via- and contact hole fill (plug) processes.

Aquisition of etch equipment (Rainbow by LAM) , new PVD/CVD equipment (Applied Materials Centura) and upgrading Applied Materials Endura with SIP chamber.

Project: Tungsten plug filling process development, PVD metallisation, barrier layers, dry etch, characterisation, test structures.

Project : Deposition of a thin Pt layer on silicon, silicide formation and test/characterisation for diode (IR) properties. Partner project with automotive industry. (2005-2007)

**Activities for 0.8 µm CMOS line (2002/2003):**

Characterisation of NEB resist for direct writing (e-beam) metal1/2 layers, test for etch suitability. Because of too high topography properties, I decided on development of hard mask process instead – which proved to be successful. Juli 2003.

Project: Development and optimisation of ICP-plasma etch processes for deep sub-µm micro structuring of metal layers. Partner project Electrotech UK

Project: Development of retrograde profile etch process for Si-trenches und Si- membranes used in ion beam lithography stencil masks. SEMATECH (1997/98/99)

Project: Development of TiN deposition (stress free layers on silicon) and etch process with very good selectivity to base layer.

Development of Si etching (horizontal) process to generate a comb-like structure of TiN levers.

Partner project with MEMS startup company. (2001/2002)

**Activity for quality management tasks to achieve ISO9001 compliance:**

Mentoring and training co-workers in FMEA method and QM-tools. Certification 1995 ff.

**In charge of micro structuring metallisation/dielectric/poly (4 technicians) (from 1992):**

- Acquisition, installation and process development for new dry etch and PVD equipment.

- Introducing plasma diagnostics to evaluate etch rates and selectivity.

- Monitoring and SPC for metallisation/barrier/dielectric within 0.8µm CMOS process

**Project: Technology transfer of an innovative passive silicon carrier (PSC) for IBM super computers from IBM research facility (Hulb):**

Post- development and stabilising processes for prototyping line and later to „ramp up“. Cooperation with IBM.

In charge of project management and process integration

Task range:

- Development of resist processes for very thick layers =>8µm.

- Installation and lithography process development on a Micralign HT600 mask aligner.

- Deposition and structuring of polyimide layers

- Deposition and wet etch of thick Al layers >3µm.

- PVD of start layers for bump process

- flip chip bonding

**Start as research scientist, process engineer at IMS Stuttgart (4/1989-..... to date)**

Department „Microsystems“:

Projekt: Researching and evaluation of technologies for a study on advanced assembly and packaging methods for Hella and Daimler Benz

**First career steps at Siemens AG, Regensburg (3/1984-3/1989)**

Project: Pilot line for GaAs-FETs used in TV-SAT-converters.

Tasks:

- COB-assembly, wire bonding, die bonding (eutectical bonding, soldering, glue attachment).

Project: Glass encapsulation of compound semiconductor microwave components. Process development for lead free and flux free soldering.

**Project: Pilot line for optical RTX modules: Assembly process development. (10+ technicians)**

Tasks:

- Assembly

- Test (electrical, mechanical, thermal characteristics, Burn-In)

- Environmental tests – MIL STD

- Quality, yield and reliability:

Introduction of QM system (documentation, test parameters, control charts, failure analysis of customer returns, yield monitoring.

**Research fellow Universität Regensburg: Institut für Festkörperphysik III; (2/1983 - 2/1984)**

Characterisation of thin magnetical layers (amorphous & nanocrystalline) with TEM (incl. Lorentz microscopy) SEM und X-ray diffraction.

## **Additional skills:**

### **OS:**

Linux, MS-DOS, Windows 95, NT, OS9, Apple Mac OS X, TOS/Gem, Irix, CP/M.

### **Programming:**

BASIC, Fortran, Pascal, Assembler MC680X0, HP-BASIC, SPS, C .

Standard Apps::

MS Office (incl. Visio, PPT), PS Creative Suite,

CALMA-Layout Tools

RS1-statistic tool for VAX/VMS.

TMA Process Simulation Tools.

**Certificates:** REFA I+II, SPC, FMEA, DOE:Taguchi, dBaseIII, MS-Project

### **Languages:**

German, English, Latin

### **Publications:**

Auszeichnungen & Veröffentlichungen:

\*"Foerderpreis fuer die Entwicklung eines Metallaetzprozesses".

(Award for the development of a deep sub- $\mu\text{m}$  metal etch process)

\*M.Irmscher,B.Hoefflinger,C.Reuter,R.Springer,"E-beam TSI process At and Below Quarter Micron Resolution and Pattern Transfer into Metal" published in June '97 EIPBN '97 Dana Point, CA

\*K.Elian,M.Irmscher,J.Buttschke,F.Letzkus,C.Reuter,and R.Springer,"Comparative evaluation of electron-beam sensitive single layer top surface imaging and bilayer chemical amplification of resist lines process for stencil mask making" published Nov/Dec 1999 American Vacuum Society,J.Vac.Sci.Technol.B17(6)

\*M.Irmscher,B.Hoefflinger,C.Reuter,R.Springer,C.Stauffer, and M.Puttock, "TSI Process At and Below Quarter "Micron Resolution and Pattern Transfer into Metal", published 1997 J.Vac Sci.techol.B15,2605

\*F.Letzkus,J.Buttschke,B.Hoefflinger,M.Irmscher,C.Reuter,R.Springer A.Ehrmann,J.Mathuni, "Dry Etch Improvements in the SOI Wafer Flow Process für IPL Stencil Mask Fabrication"

\*J.Buttschke,A.Ehrmann,E.Haugeneder,M.Irmscher,R.Kaesmaier,K.Kragler,F.Letzkus,H.Loeschner,J.Mathuni,I.W.Rangelow,C.Reuter,F.Shi,R.Springer "PN and SOI Wafer flow process for stencil mask fabrication"

\*Mathias Irmscher, Jörg Buttschke, Ron Carpio, Brook Chao, Wei-Lun Jen, Corinna Koepernik, Lorenz Nedelmann, Jordan Owens, Frank Palmieri, Marcus Pritschow, Christian Reuter, Holger Sailer, Ken Satoodeh, Jeff Wetzell, Bruce Wilks, Grant Willson

High resolution nanoimprint templates for dual damascene: fabrication and imprint results [*Conference papers (reviewed)*] in *Advanced Lithography 2008, Proc. of SPIE Vol. 6921, 692101*, San Jose, CA, USA, Emerging Lithographic Technologies XII, Frank M. Schellenberg, March 26, 2008, Kompletter Konferenzband am IMS vorhanden (2008)

\*Horst Rempp, Joachim N. Burghartz, Christine Harendt, Nicoleta Pricopi, Marcus Pritschow, Christian Reuter, Harald Richter, Inge Schindler, Martin Zimmermann

Ultra-Thin Chips on Foil for Flexible Electronics [*Conference papers (reviewed)*] in *ISSCC Digest of Technical Papers, International Solid-State Circuits Conference 2008*, San Francisco, CA, USA, (Vortrag), February, 2008, pp. 334-617, ISBN: 978-1-4244-2011-7, Kompletter Konferenzband am IMS vorhanden (2008)

\*Corinna Koepernik, Dirk Beyer, P. Dress, T. Hoffmann, Peter Hudek, Mathias Irmscher, C. Krauss, Bernd Leibold, D. Mueller, C. Reuter, Reinhard Springer, J. Szekeresch, Peter Voehringer

Mask Patterning Using Chemically Amplified Resists and the Novel STEAG Hama Tech Blank Coater ASR5000 [*Conference papers (reviewed)*]

in *Proc. of 22nd BACUS Symposium on Photomask Technology*, Monterey, CA, USA, September 30, 2002, p. 12 (2002)

\*Mathias Irmscher, Jörg Buttschke, K. Elian, Bernd Höfflinger, K. Kragler, Florian Letzkus, J. Ochsenhirt, C. Reuter, Reinhard Springer

Resist technologies for Ion Projection Lithography (IPL) stencil mask making [*Konferenzbeitrag (reviewed)*]

in *Proc. of SPIE Conference on Microlithography 2000*, Santa Clara, CA, USA, 27. Februar 2000 (2000)

\*Mathias Irmscher, K. Elian, Jörg Buttschke, Florian Letzkus, C. Reuter, Reinhard Springer  
Comparative evaluation of e-beam sensitive single layer TSI and bilayer CARL process for stencil mask making [*Papers of journals (review)*]

*Journal of Vacuum Science & Technology B: Microelectronics and Nanometer Structures*, vol. 17, no. 6, pp. 3122-3126, November, 1999 (1999)