

1 Preface

As in preceding years, the Center for Microtechnologies in close cooperation with the “Micro Devices and Equipment” Department Chemnitz of the Fraunhofer Institute for Microintegration and Reliability (FhG-IZM) in Berlin has further consolidated its position as a Center of Excellence in the fields of *microelectronics back end technologies* and *microsystem technologies*.



The key to our success was an interdisciplinary cooperation of several chairs within the ZfM. Based on this idea, ZfM's primary mission is to provide an intellectual and working environment that makes possible education through teaching and research in areas that require or may benefit from advanced ULSI-interconnect technologies, Si-nanotechnology and new developments and ideas in the field of MEMS by using microfabrication technologies. ZfM's technology laboratories provide a complex of modern microelectronics laboratories, clean rooms and microfabrication facilities.

The FhG-IZM department “Micro Devices and Equipment” moved into a new building with new, well equipped laboratories in the year 2002. Furthermore the reconstruction of one ZfM clean room was finished in 2002, too.

It is my pleasure to summarize some of the scientific highlights of 2002:

- Testing of nanoporous SiO₂ and CF-polymers as low k material within damascene process modules (including copper and CMP).
- Application of new barrier materials and processes for copper based technologies.
- A novel high aspect ratio technology for MEMS fabrication using standard silicon wafers was developed.
- A high aspect ratio vertical FET sensor for motion detection has been tested successfully.
- Multiple band sensor arrays for vibration monitoring based on near-surface silicon bulk micromechanics were fabricated.
- New methodologies and tools for order reduction of finite element models to provide links between component and system design for microsystems were developed and applied.
- New approaches for wafer bonding technologies were established.

We have further expanded our international activities and cooperations with important institutes in material science and MEMS worldwide. In this context we have established a representative office in Shanghai, People's Republic of China, in April 2002.

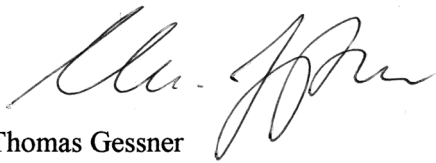
The 2002 Annual Report of the Center for Microtechnologies provides an overview of the facilities, staff, faculty and students associated with the ZfM, as well as a description of many of the ongoing research projects which make use of the ZfM facilities.

These developments, which are based on close links with industry and cooperation with German as well as international institutes, contribute to an advanced education for our students. We kindly acknowledge the support of the Federal Ministry of Research, the German Research Foundation, the Saxon Ministry of Science and the European Commission.

As always, we are driven by our triple aims of excellence in education, scientific and technological research and by providing a comprehensive range of research and development services to industry.

I would like to thank all my colleagues, the scientific fellows and technicians for all their dedicated work.

I look forward to participating in the promising development of new devices and concepts through the use of silicon technology.

A handwritten signature in black ink, appearing to read 'Th. Gessner', written in a cursive style.

Thomas Gessner
Director of the Center for Microtechnologies