



Annual Report 2023 Compact

Greetings

2023 - a year of change and innovation

The year 2023 was characterized by progress and adaptation to the dynamic challenges of our time. A lot has also happened at Fraunhofer ISIT this year. In Fraunhofer ISIT's review of 2023, we present an overview of the innovative solutions that the institute has developed to meet both global trends and the specific requirements of the industry. We also give you an overview of the key events, central research projects and relevant facts, figures and data from our institute.

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Editorial

Dear readers,

2023 was the first full calendar year that I was able to experience as Institute Director at Fraunhofer ISIT. As we look back on 2023, it is impressive to see how Fraunhofer ISIT is driving the development of technologies that address some of the most pressing needs of our society. I would therefore like to thank you all for the time and effort that each and every one of you has put into enriching and strengthening ISIT.

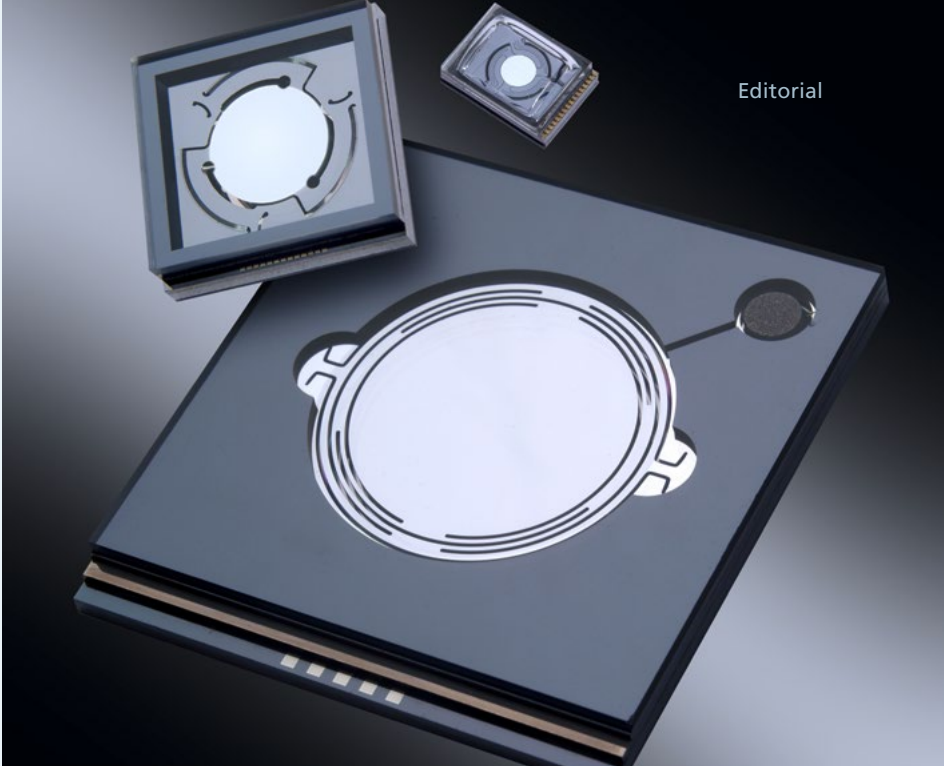
We at ISIT greatly appreciate the trust placed in us by our customers. It is the driving force behind our enthusiasm to research, learn and provide the world with new advances every day. Our research is particularly enriched by the Christian-Albrechts-Universität zu Kiel. I would also like to praise the strong collaboration and cooperation with our industrial partners.



Prof. Dr.-Ing. Holger Kapels

Neurosmart

2023 was also characterized by the expansion of our research in the field of neuromorphic computing. The aim is to develop AI systems that work more efficiently and save energy. At Hannover Messe 2023, we presented our latest developments in the field of MEMS optics and acoustics. Our innovations, such as those we are developing in the Fraunhofer lead project NeuroSmart, are setting trends for the industrial metaverse and met with great interest from visitors and potential partners.



For the coming year, we have set ourselves the goal of focusing our research activities even more strongly on the areas of energy efficiency, digital transformation and sustainability. We are convinced that the challenges of the future can only be overcome through close cooperation.



QuWLIB

The handover of funding in October 2023 by Federal Minister of Economics Dr. Robert Habeck was a particular highlight that shows us how much politicians trust in our impetus and innovation. The federal government is supporting our project to set up a qualification center for battery specialists together with the two battery manufacturers Northvolt and CustomCells, the Renewable Energies Hamburg (EEHH) industry network under the leadership of the training company Heinze Akademie GmbH, with around 20 million euros. The trust placed in this project, which is unique in Germany, shows us that we are on the right track.

Summary 2023

Finally, I would like to thank all our employees and our partners for their commitment and support. Together, we will continue to be at the forefront of technological developments that connect industry and science and have a positive impact on our society.

2024 will therefore see us using our expertise at ISIT to provide new impetus for change.

I invite you to find out more about our projects and successes in our 2023 Annual Report.

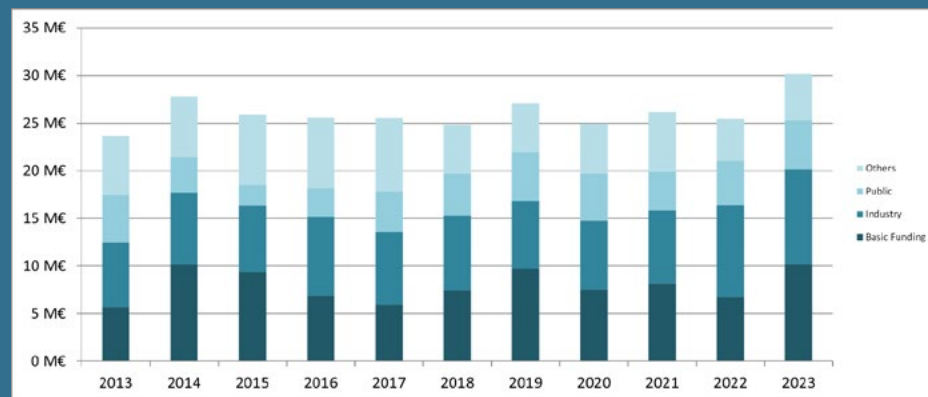


Finance, Human Resources, Organisation

Representative figures

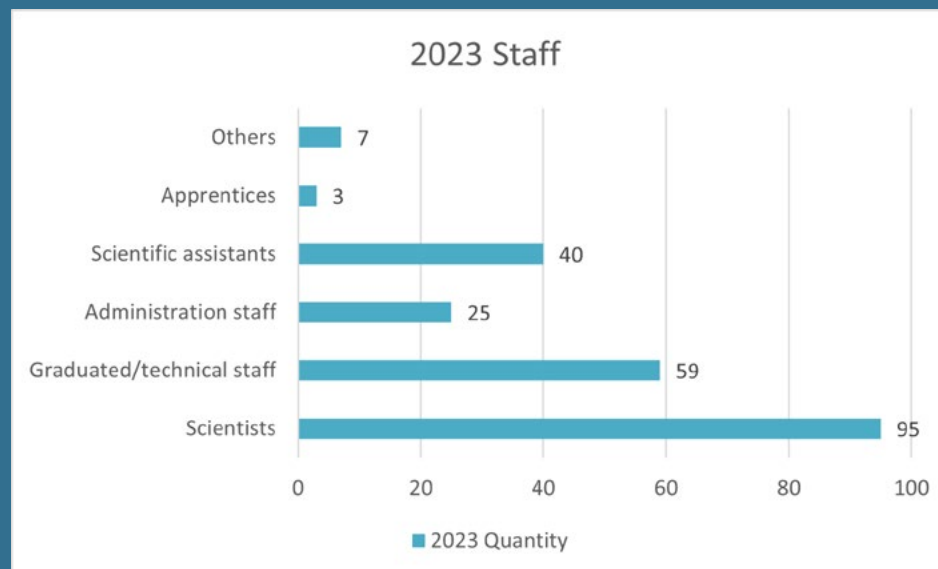
INCOME OF FRAUNHOFER ISIT FROM 2013 TO 2023

The 2023 budget was financed by project revenue from industry/business associations/small and medium-sized enterprises in the amount of T€ 10,008, from the federal government/project sponsors/states in the amount of T€ 5,128 and from others in the amount of T€ 4,844. In addition, FhG projects and basic funding amounted to T€ 10,184.



STAFF DEVELOPMENT

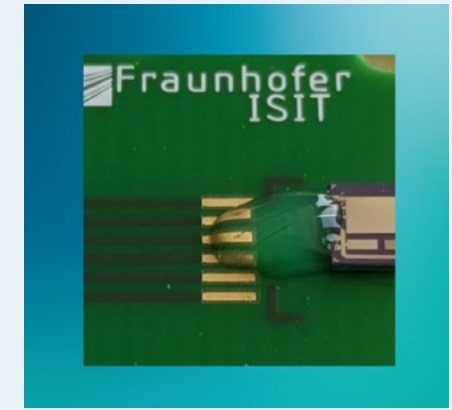
At the end of 2023, the staff consisted of 229 employees. 95 were employed as scientific staff, 59 as graduate/technical staff and 25 in organization and administration. The employees were supported by 40 research assistants, 7 interns and 3 trainees.



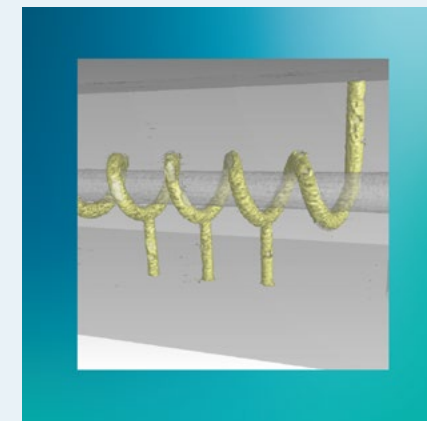
Lighthouse projects 2023



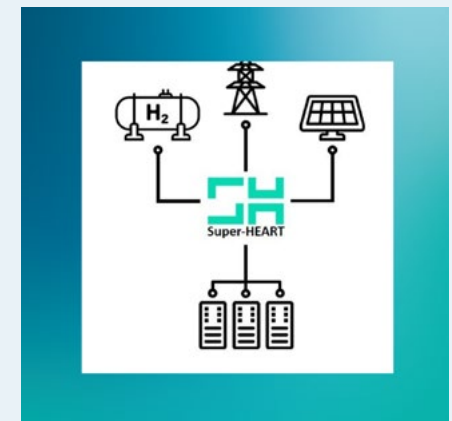
PowerCare



ForMikro - Salsa



IPD-GLAS



Super-HEART



Smart Cells

Important figures and events

Events

Face-to-face events

- **Handover of the QuW-LIB grant with Dr. Robert Habeck**
October 9, 2023, Itzehoe
- **Science Day KielRegion**
September 29, 2023, Kiel
- **Green ICT Connect / FMD Innovation Day**
September 13, 2023, Berlin
- **Microtec nord 2023**
September 14, 2023, Heide
- **CMP & WET Usermeetings**
Spring Meeting, April 20 & 21, 2023, Buchs
Fall Meeting, November 30 & December 1, 2023, Chemnitz

Tradefairs

Tradefairs and exhibition

- **Photonics West 2023**
January 31 - February 2, 2023
San Francisco
- **DAGA 2023**
March 6 - 9, 2023
Hamburg
- **APEC 2023**
March 20 - 22, 2023
Orlando, FL
- **International Battery Seminar & Exhibit 2023**
March 28 - 30, 2023
Orlando, FL
- **Volta-X 2023**
March 28 - 30, 2023
Stuttgart
- **Jobs4me 2023**
April 1, 2023
Heide
- **Hannovermesse 2023**
April 17 -21, 2023
Hannover
- **Fraunhofer Battery Alliance 2023**
April 26 - 28, 2023
Münster

- **PCIM 2023**
May 9 - 11, 2023
Nuremberg
- **SMT 2023**
May 9 - 11, 2023
Nuremberg
- **vocatium 2023**
June 20 - 21, 2023
Neumünster
- **Transducers 2023**
June 25 - 29, 2023
Kyoto, Japan
- **Laser Photonics 2023**
June 27 - 30, 2023
Munich
- **2023 IEEE International Ultrasonics Symposium**
September 6, 2023
Montreal, Canada
- **AzubIZ 2023**
September 22, 2023
Itzehoe
- **getBIZzy 2023**
September 28, 2023
Meldorf
- **BerufsInformationsBörse 2023**
October 10 - 11, 2023
Rendsburg
- **MikroSystemTechnik (MST) Kongress 2023**
October 23 - 25, 2023
Dresden

Teaching

Teaching assignments at universities and colleges

- **S. Gu-Stoppel**
Microtechnology and Microsystems Design, West Coast
University of Applied Sciences, Heide
- **H. Kapels**
Professorship of Semiconductor Devices in Power Electro-
nics, Faculty of Engineering, Kiel University
- **M. Liserre**
Professorship Power Electronics,
Kiel University
- **F. Lofink**
Micro- and Nanosystem Technology, Semiconductor
Technology. Faculty of Engineering, Kiel University

- **A. Müller-Groeling**
Professorship Microsystems and Technology Transfer,
Faculty of Engineering, Kiel University
- **O. Schwarzelbach**
Microelectromechanical Systems (MEMS), Institute of
Electrical Metrology and Signal Processing, Graz University
of Technology, Austria

Patents

2023

- **B. Wagner, F. Lofink, D. Kaden, S. Fichtner**
Ferroelectric material, MEMS component comprising a
ferroelectric material, MEMS device comprising a first
MEMS component, method of producing a MEMS
component, and method of producing a CMOS-compati-
ble MEMS component
US 11,744,158 B2
- **B. Wagner, F. Lofink, D. Kaden, S. Fichtner**
Ferroelektrisches Material, MEMS-Bauteil mit diesem
Material, MEMS-Vorrichtung, sowie Herstellungsverfahren
EP 3766109 B1
- **B. Wagner, S. Fichtner, F. Lofink**
Ferroelectric semiconductor device and method for
producing a memory cell
US 11,672,127 B2
- **F. Stoppel, B. Wagner, S. Gu-Stoppel**
Mikromechanischer Schallwandler
EP 3632135 B1.JP 730312
- **H. Kapels, Z. Yu**
Vorrichtung und Verfahren zur Erzeugung einer Wechsel-
spannung
EP 3455932 B1
- **H.J. Quenzer, V. Stenchly**
Verfahren zur Herstellung optischer Komponenten unter
Verwendung von Funktionselementen
CN ZL201780032044.4
- **J. M. Ophhey, A. Würsig**
Process for the solvent-free coating of foils for electroche-
mical applications
US 11,688,844 B2
- **M. F. Niekiet, F. Lofink, T. Lisec**
MEMS-System
EP 3899992 B1
- **M. F. Niekiet, F. Lofink, T. Lisec**
MEMS sound transducer
US 11,589,169 B2

- **N. Laske, H.J. Quenzer, V. Stenchly, A. Kulkarni, A.V. Schulz-Walsemann**
Method for producing lens elements and packaged
radiation-sensitive devices on wafer level
US 11,815,699 B2
- **S. Gu-Stoppel, D. Kaden, C. Eisermann**
Vorrichtung mit einer Feder und einem daran aufgehäng-
ten optischen Element
EP 2808721 B1
- **S. Gu-Stoppel, H.J. Quenzer, J. Janes, F. Heinrich**
Piezoelektrischer Positionssensor für piezoelektrisch
angetriebene resonante Mikrospiegel
EP 2998777 B1
- **T. Lisec, F. Lofink**
Method of producing an oppositely magnetized magnetic
structure
US 11,742,123 B2
- **W. Reinert, V. Stenchly, H.-J. Quenzer**
Hermetisch verkapselte, optische Projektionsanordnung
und Verfahren zum Herstellen derselben
DE 102021206477 B4

Scientific Publications

Selected publications

Peer-reviewed paper

- **J.-Y. Hwang , L. Wysocki , E. Yazar, G. Wille, F. Röhr, J. Albers and S. Gu-Stoppel**
Low Power Compact 3D-Constructed AlScN Piezoelectric MEMS Mirrors for Various Scanning Strategies.
MPFI micromachines, 2023.
- **P. Schmitt, B. Gojdka, T. Lisec, M. Kroll and M. Hoffmann**
SOI Integrated Micromagnets for Mechanical Magnetic Field Detection.
IEEE Sensors Letters, 2023.
- **D. Santos-Carballal, O. Lupan, N. Magariu, N. Ababii, H. Krüger, M. T. Bodduluri, N. H. de Leeuw, S. Hansen, R. Adelung**
Al2O3/ZnO composite-based sensors for battery safety applications: An experimental and theoretical investigation.
Nano Energy, 2023.
- **S. Schröder, N. Ababii, M. Brînza, N. Magariu, L. Zimoch, M. T. Bodduluri, T. Strunskus, R. Adelung, F. Faupel and O. Lupan**
Tuning the Selectivity of Metal Oxide Gas Sensors with Vapor Phase Deposited Ultrathin Polymer Thin Films.
Polymers, 2023.
- **M. Frankenberger, C. Mock, N. Kaden, I. Landwehr, J. Veitl, J. Ophey, G. Schälicke, M. Görke, H. Holeczek, A. Kwade, K. Dröder, K.-H. Pettinger**
Improving Wetting Behavior and C-Rate Capability of Lithium-Ion Batteries by Plasma Activation.

Energy Technology, 2023.

Conference paper

- **B. Gojdka, D. Cichon, M. Stahl-Offergeld, D. Schröder, N. Clausen, C. Hedayat, H.-P. Hohe, T. Lisec**
Fully Integrated Back-Biased 3d Hall Sensor with Wafer-Level Integrated Permanent Micromagnets
IEEE MEMS, 2023.
- **B. Gojdka, O. Behrmann, M. T. Bodduluri, T. Lisec**
PowderMEMS – Generic Integration of Functional Three-Dimensional Microstructures on Wafer Level.
MikroSystemTechnik Congress, 2023.
- **F. Ziegler, D. Cichon, M. Stahl-Offergeld, D. Schröder, N. Clausen, C. Hedayat, H.-P. Hohe, T. Lisec, B. Gojdka**
Demonstration of wafer-level integrated permanent bias micromagnets for magnetic field sensors.
MikroSystemTechnik Congress, 2023.
- **J. Cipo, R.-M. Neubieser, R. Mörtel, T. Lisec, M. Michel, F. Lofink, B. Gojdka**
Towards Integrated 3D Microbatteries: Study of LiPON on Porous Electrodes.
MikroSystemTechnik Congress, 2023.
- **O. Behrmann, T. Lisec, F. Klingbeil, N. Kyoushi, B. Gojdka**
Gas permeable protection caps for wafer level chip scale packaging (WLCSP) of MEMS environmental sensors.
EMPC, 2023.
- **O. Behrmann, T. Lisec, S. Billat, A. Dehé, B. Gojdka**

Influence of a novel solid thermal isolation material for MEMS in thermopile sensitivity and dynamic

response of a MEMS flow sensor.
MikroSystemTechnik Congress, 2023.

- **O. Behrmann, T. Lisec, S. Schröder, B. Gojdka**
Gas permeable environmental protection caps for Wafer level capping of MEMS gas and pressure sensors.
Transducers, 2023.
- **T. Dankwort, M. Ahmed, S. Grünzig, A. Khare, B. Gojdka**
High-performance Aluminum Scandium Nitride MEMS energy harvester with wafer-level integrated micromagnets for contactless rotational motion harvesting.
IEEE ICM, 2023.
- **L. L. Rautmann, M. Ahmed, B. Rieck, J. Witte, T. Emter, H. Renkewitz, S. Kosleck**
Concept and Design of a Prototype Autonomous, Modular Subsea Bottom Station.
Oceans, 2023.
- **I. Ge, Y. Jiang, T. Dankwort, S.W. Wright, M. E. Kiziroglou, E. M. Yeatman**
MEMS ALN piezoelectric beams with integrated NdFeB magnets for power line and rotational motion energy harvesting.
PowerMEMS, 2023.
- **A. Burger**
Increasing Battery Safety of Lithium-Ion Batteries By Using Cell-Internal Glass Fiber Sensors for in-Situ Temperature Monitoring.
ECS, 2023.
- **G. D. Astudillo, H. Beiranvand, F. Cecati, C. Werlich, A. Würsig, M. Liserre**
Integrated Strategy for Optimized

Selected speeches

- **B. Gojdka, T. Dankwort, M. Ahmed, M. T. Bodduluri, T. Lisec**
Leveraging mechanical MEMS energy harvesting for IoT applications; Santa Clara, CA, USA, 20.06.2023
- **B. Gojdka**
PowderMEMS – current applications; Itzehoe, 31.05.2023
- **F. Ziegler**
PowderMEMS - Technology for innovative MEMS; Heide, 14.09.2023
- **J. Cipo**
Towards LiPON on porous Electrodes; Chemnitz, 11.09.2023
- **O. Behrman**
PowderMEMS Mikrostrukturen für MEMS Sensoren; Freiburg, 10.05.2023
- **O. Behrmann**
PowderMEMS für Röntgengitter; Itzehoe, 19.07.2023
- **J. Cipo**
LiPON ALD-Prozess @ IMS; Duisburg, 09.03.2023
- **T. Dankwort**
MEMS piezoelectric energy harvesting @Fraunhofer ISIT; Dresden, Fraunhofer IPMS, Digital, 15.06.2023
- **M. Ahmed**
Zero-Power Wake-up for Event-Trigged Ocean Wave Monitoring; Dresden, 24.09.2023

- **J. Cipo**
Towards Integrated 3D Microbatteries: Study of LiPON on Porous Electrodes; Dresden, 25.10.2023
- **H.J. Quenzer**
3D-Glasfließ-Technologie: Anwendungen, Prozesse, Herausforderungen; Online, 07.11.2023
- **T. Dankwort, M. Ahmed, N. Clausen, B. Gojdka**
Micro-Fabrication Techniques and Materials for Advanced MEMS Energy Harvesting; Dresden, 25.10.2023
- **J. Ophey**
Process innovations at Fraunhofer ISIT for future battery cell production; Greenville, South Carolina, 17.05.2023
- **A. Würsig**
Aktuelle Entwicklungen in der Batteriespeichertechnologie - Von der Zelle zum System; Itzehoe, 27.04.2023
- **A. Würsig**
Design and Production of Lithium-Ion Battery Cells – Current Developments; Sønderborg, 28.02.2023
- **A. Würsig**
New Developments for Battery Materials for Automotive Applications; München, 26.10.2023
- **A. Burger**
Increasing Battery Safety of LIB by using Cell-Internal Glass Fiber Sensors for in-situ Temperature Monitoring; Göteborg, 08.10.2023
- **D. Kähler**
Add-In ‚GoalSeeker‘ advanced parameter optimization in single and combined models; München, 26.10.2023
- **J. Fankhänel, F. Stoppel, T. Giese, I. Pieper, L. Castellanos and C.**

- Eisermann**
Highly miniaturized MEMS speakers for in-ear applications; Turin, 15.09.2023
- **J. Meyer, S. Moench, T. Giese, S. Fichtner, L. Thormählen, V. Lebedev, A. Žukauskaitė, E. Quandt, F. Lofink**
Thin-film surface acoustic modes for magnetoelectric sensing; Dresden, 21.09.2023
- **J. Meyer, M. Z. Ghor, M. Rickers, S. Fichtner, M. T. Bodduluri, L. Blohm, E. Yazar, T. Giese, F. Lofink**
Sputtered FeCoB Soft Magnetic Thin Films for Surface Acoustic Wave Sensors; Dresden, 24.10.2023
- **T-N. Kreutzer, F. Stoppel, M.Z. Ghor, S. Fichtner, F. Lofink**
Piezoelektrische MEMS-Aktuatoren basierend auf ferroelektrischen Aluminium-Scandium-Nitrid; Dresden, 24.10.2023
- **M. Langwasser**
Thermal Digital Twin of Power Electronics Modules; Karlsruhe, 30.11.2023
- **M. Liserre**
Power Electronics for a Smart Energy Management; Columbia University's Data Science Institute, 03.11.2023
- **M. U. Mutarraf, S. Pugliese, M. Liserre**
Stability and accuracy analysis of PHIL interface algorithms; Lausanne, Swizerland, 07.02.2023
- **B. Gojdka, D. Cichon, M. Stahl-Offergeld, D. Schröder, N. Clausen, C. Hedayat, H.-P. Hohe, T. Lisec**
Fully Integrated Back-Biased 3d Hall Sensor with Wafer-Level Integrated Permanent Micromagnets; Gar-ching, 17.01.2023

Scientific Publications

- **B. Gojdka, O. Behrmann, M. T. Bodduluri, T. Lisec**
PowderMEMS – Generic Integration of Functional Three-Dimensional Microstructures on Wafer Level; Dresden, 24.10.2023
- **F. Ziegler, D. Cichon, M. Stahl-Offergeld, D. Schröder, N. Clausen, C. Hedayat, H.-P. Hohe, T. Lisec, B. Gojdka**
Demonstration of wafer-level integrated permanent bias micro-magnets for magnetic field sensors; Dresden, 25.10.2023
- **O. Behrmann, T. Lisec, F. Klingbeil, N. Kyoushi, B. Gojdka**
Gas permeable protection caps for wafer level chip scale packaging (WL CSP) of MEMS environmental sensors; Cambridge, UK, 12.09.2023
- **O. Behrmann, T. Lisec, S. Billat, A. Dehé, B. Gojdka**
Influence of a Novel Solid Thermal Isolation Material for MEMS on Thermopile Sensitivity and Dynamic Response of a MEMS Flow Sensor; Dresden, 25.10.2023
- **O. Behrmann, T. Lisec, S. Schröder, B. Gojdka**
Gas Permeable Environmental Protection Caps for Wafer Level Capping of MEMS Gas and Pressure Sensors; Kyoto, Japan, 27.06.2023
- **T. Dankwort, M. Ahmed, S. Grünzig, A. Khare, B. Gojdka**
High-performance Aluminum Scandium Nitride MEMS energy harvester with wafer-level integrated micromagnets for contactless rotational motion harvesting; Loughborough, UK, 15.03.2023
- **K. Reiter**
Materialographische Betrachtung dreidimensionaler pulverbasierter Mikrostrukturen für Mikroelektro-mechanische Systeme hergestellt mit dem PowderMEMS-Verfahren; Leoben, Österreich, 14.09.2023
- **F. Stoppel, J. Fankhänel, T. Giese, I. Pieper, S. Grünzig, C. Eisermann**
Highly miniaturized in-ear MEMS loudspeaker; New York, USA, 26.10.2023
- **F. Stoppel, J. Fankhänel, L. Castellanos, T. Giese, C. Eisermann, I. Pieper**
A novel type of MEMS transducer for airborne ultrasound applications; Montreal, Canada, 06.09.2023
- **F. Stoppel, J. Fankhänel, T. Giese, C. Eisermann, I. Pieper, D. Kaden, L. Castellanos, S. Grünzig**
Highly miniaturized in-ear MEMS loudspeaker featuring high SPL; Kyoto, Japan, 17.06.2023
- **M. Liserre**
Lithium-Ion Battery System Optimization Using Power Electronics and Intelligent BMS; SJTU, Shanghai, China, 12.06.2023
- **M. Liserre**
Power Electronics for a Smart Energy Management: from Smart Transformer to 100 % Electronic Grid by Means of Grid-Forming and Talkative Power Conversion Technologies; Shanghai, China, 10.06.2023
- **M. Liserre**
Power Electronics for Smart Energy Management; Delhi, India, 27.04.2023
- **M. Liserre**
Lithium-Ion Battery System Optimization Using Power Electronics and Intelligent BMS; Aalborg, Denmark, 14.04.2023
- **M. Liserre**
Lithium-Ion Battery System Optimization Using Power Electronics and Intelligent BMS; Copenhagen, Denmark, 13.02.2023
- **S. Wiljes**
Computertomografie in der Aufbau und Verbindungstechnik; München, 19.10.2023
- **M. Liserre, J. Kuprat, Y. Pascal, M. Votava**
Thermal modelling and analysis of power electronics modules for optimal power converter design and control; Nürnberg, 10.03.2023
- **H. Schimanski**
Investigation of the effect of ionic contamination in thin gaps on assemblies close to reality with new miniaturized devices; Lyngby/Denmark, 17.03.2023
- **H. Schimanski**
LTS - Low temperature soldering - Niedrig schmelzende Lote in der Elektronikfertigung; Nürnberg, 09.05.2023
- **H. Schimanski**
Fortschrittliche Fehleranalyse als Grundlage für zuverlässige Elektronik; Hamburg, 07.06.2023
- **H. Schimanski**
LTS - Low temperature soldering - Niedrig schmelzende Lote in der Elektronikfertigung; Tönning, 04.07.2023
- **H. Schimanski**
Qualitätsgesicherte Elektronikfertigung durch fortschrittliche Fehleranalyse - Von der Fehlerursache zu Lösungen durch qualifizierte, fehlerfreie Schadensanalytik ; Laichingen, 07.07.2023

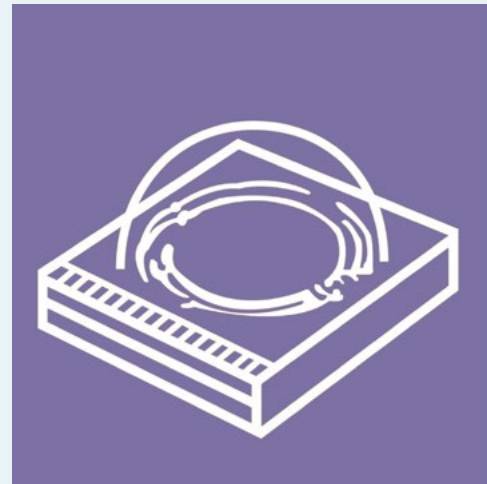
- **H. Schimanski**
Niedertemperatur-Weichlöten in der Elektronikfertigung - zuverlässige Lote für die industrielle Anwendung?; Heide, 14.09.2023
- **H. Schimansk**
Fortschrittliche Fehleranalyse als Grundlage für zuverlässige Elektronik - durch Ursachenforschung Fertigungsprozesse optimieren; Dresden, 27.09.2023
- **Max von Elm**
Elektrische Charakterisierung von AlScN-basierten ferroelektrischen Feldeffekttransistoren. Bachelorarbeit, CAU zu Kiel, Januar 2023.
- **Marc Gottselig**
Direktmontage ungehäuster Laserdioden auf Siliziumwafer. Bachelorarbeit, FH Westküste, 16.01.2023.
- **Md Mahmudul Hasan**
Development pf SAW for magnetic field sensor based on AlSc thin fil on sapphire. Masterarbeit, TU Chemnitz, 25.08.2023.
- **Danny Haist**
Quantifizierung eines magnetooptischen Messverfahrens zur lokalen Bestimmung der magnetischen Flussdichte von Mikromagneten auf Wafer Ebene. Bachelorarbeit, FH Westküste, 01.03.2023.
- **Philipp Hickisch**
Development and analysis of a novel MEMS in-plane energy harvesting concept. Masterarbeit, Uni Rostock, 29.08.2023.
- **Nihal Keerthi Joshi**
Modeling and control of grid-connected hydrogen based distributed networks. Masterarbeit, CAU zu Kiel, 08.12.2023.
- **Niklas Kyoushi**
Entwicklung und Charakterisierung von gasdurchlässigen Umweltschutzkappen für MEMS-Sensoren. Masterarbeit, Gottfried Wilhelm Leibniz Universität Hannover, 02.11.2023.
- **André Lange-Clary**
Marktanalyse der PowderMEMS-Technologie im Anwendungsbereich der gestützten Magnetfeldsensoren. Masterarbeit, FH Westküste, 24.10.2023.
- **Shirke Pallavi**
Investigation of conductive bonding with Ohmic Contacts between GaN and Si for Vertical Power Devices. Masterarbeit, TU Hamburg, 04.02.2023.
- **Emily Ramm**
Das Assessment Center als Personal-auswahlinstrument für kaufmännische Auszubildende – Soll-Ist-Vergleich am Beispiel des Fraunhofer ISIT. Bachelorarbeit, FH Flensburg, 01.06.2023.
- **Mirko Schramm**
Betrachtung des Karrieremodells am Fraunhofer ISIT zur Ermittlung des Personalentwicklungsbedarfs. Bachelorarbeit, FH Westküste, 10.07.2023.
- **Patrick Schütt**
Optimierung der FEM-Simulationen piezoelektrischer MEMS-Spiegel auf Basis der experimentellen Charakterisierung des dynamischen Schwingungsverhaltens. Masterarbeit, FH Westküste, 07.07.2023.
- **Lukas Simon**
Advanced FPGA-based gate driver with controllable slope. Masterarbeit, CAU zu Kiel, 25.10.2023.
- **Konda Yoganand**
Intelligent Junction Temperature Estimation with Vce Measurement. Masterarbeit, CAU zu Kiel, 15.08.2023.

Master/Bachelor Theses

Projects

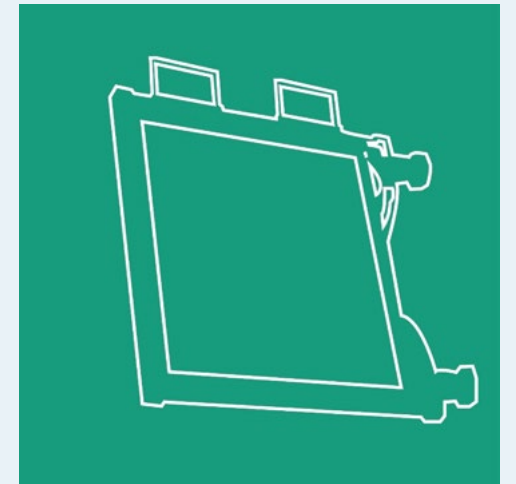
MEMS Application

- 3D Gyro
- NeurOSmart OS - Analogous neuromorphic accelerators to enable efficient and secure smart sensors
- PiMAR1 - MEMS Spiegel für AR/VR
- MEMS-Boro - Endoskop-Anwendung im Flugzeugbau und Materialprüfung
- ICON – NLP - Scanning PCSEL for lenseless LiDAR
- FQS_FBH Quanten Sensorik - MEMS Spiegel für Quanten Sensorik
- TOAM II - Translatorische optische Aktuatoren für Phasen Anpassung der Faserlaser
- DFG-1D Fast MEMS Mirror - Fast MEMS Mirror for LiDAR
- MEMS-Mirror for Auto-LiDAR - MEMS-Spiegel für LiDAR-Sensoren im Automobilbereich
- JI-Zeilenfilter - Lift-Off für optische Filter (IST Unterauftrag)
- KonneQt - KonneQt - MEMS Spiegel für Paul-Fallen in Quantencomputing
- Silflex - HR Beschichtung für Mikrospiegel
- CAPS TOAM - Translatorische optische Aktuatoren für Phasen Anpassung der Faserlaser
- MISTRAL - Glas Strukturen für die translatorischen Aktoren
- MEMS Spiegel für LiDAR - Entwicklung von Mikrosiegeln für LiDAR im industriellen Umfeld
- SFB 1261-Z01 - From Magnetoelectric Composite to Biomedical Applications - Z1: Cantilever-basierter Magnetfeldsensor
- SFB 1261/3-A09 - From Magnetoelectric Composite to Biomedical Applications - A9: SAW Magnetfeldsensor
- SALSA - FE-AlScN vom Material zur Anwendung
- SCALING - FE-AlScN + HEMT Leistungstransistoren
- SEC-fly - AlScN basierter FeFET für neuromorphes Rechnen (Fortsetzung Innopush SEC als Vorstandsprojekt)
- Dünnschicht AlN-basierte Druckkopf-Entwicklung
- NeurOSmart AS - Analogous neuromorphic accelerators to enable efficient and secure smart sensors
- MAPMIND - mikromechanische Ultraschallwandler (MUT) für Anwendungen des deutschen Mittelstands
- SPKR Push - Development of A-samples of ISIT microspeakers
- FeelScreen - Ultraschall Haptics für Displays
- PASMIE -Entwicklung von piezoelektrischen Ultraschallwandlern für photoakustische Bildgebung im Medizinbereich
- PRECISE - Piezo-Kantilever für Biosensorik
- VIP+ Antrag HERMES - Rekristallisation a-Si für CMOS-integrierte Inertialsensorik (Nachfolge MUSIC)
- AlScN Dünnschichten - AlScN für MEMS-Aktorik
- PZT Prozess - PZT Schichtentwicklung
- BioCantilever - MEMS-Cantilever für Bio-Sensing
- Mikro-Magnetik - Agglomerierte Mikromagnete für innovative MEMS-Bauelemente (Powder-MEMS)
- OTC-Base - Harvester für Unterwassersysteme
- GreenICT - Harvester für GreenICT
- Smarties - Energy Harvester for Smart Tiers



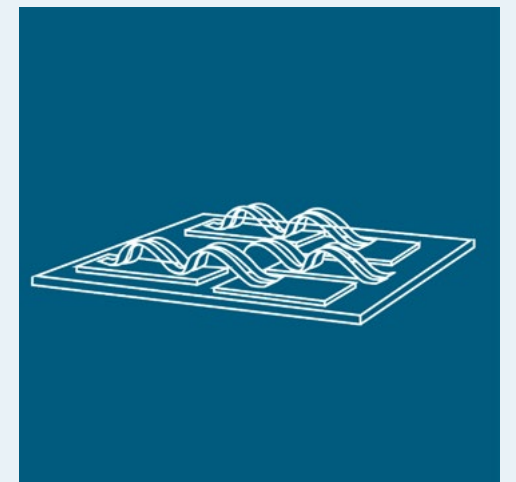
Research center FAB-SH

- COBRA - CObalt-free Batteries for FutuRe Automotive Applications (COBRA)
- DuPont's separator technology - Evaluation of DuPont's separator technology in 10 Ah pouch cells
- Power400 - Hochleistungsladesystem mit integriertem Pufferspeicher
- FAB-SH Anlageinvest - Anlageinvestment für das Vorhaben FAB-SH
- SiLine - Entwicklung von großflächigen, porösen Si-Film-Anoden für Lithium/Silizium-NMC Energiespeichern (SiLiNE) hin zur industriellen Fertigung.
- FB2 Hybrid - Verbundvorhaben: Querschnittplattform Hybridisierung; Teilvorhaben: Verarbeitung von Hybrid-Festkörperelektrolyten und Kathoden mittels Trockenbeschichtungsprozessen zu Festkörperbatterien
- QuW-LIB - Qualifikation und Weiterbildung von Fachkräften entlang der gesamten Wertschöpfungskette nachhaltiger Lithium-Ionen-Batterien
- NUBase - Neuartige Untersuchungsmethoden zur Batteriesicherheit (NUBase)
- TroPMelt – Trockenbeschichtung - Trockene Pulver-Schmelz-Kalandrierung für eine umweltfreundliche und kostengünstige Elektrodenproduktion
- BeLiMIA - Beobachtung von Lithiumionenzellen mittels Zusammenführung von Messmethoden zur Identifizierung und Quantifizierung von Alterungsvorgängen (BeLiMIA)
- SimBAS - Simulation von Batteriezellen und Anwendungen in Speichersystemen (SimBAS)



Power Electronics

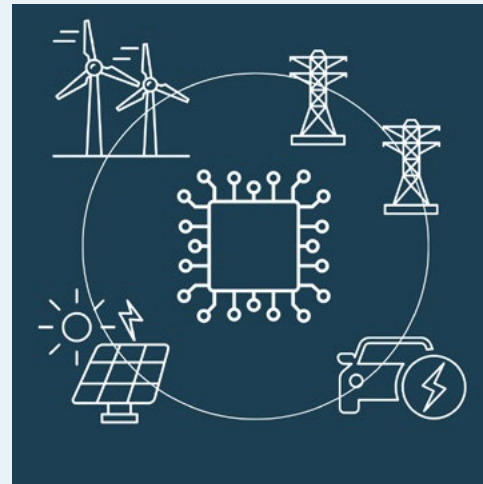
- FlaMe - Fully controlled lot-size 1 manufactured Power Modules
- Size Is Important 2 - Evaluierung von Silizium-Membranen für die Analyse von sub- μ Plastikpartikeln in der Umwelt
- NeurOSmart - Analogous neuromorphic accelerators to enable efficient and secure smart sensors
- SCALING - Scandium-Aluminium-Nitrid für lineare Breitbandverstärker der nächsten Messgeräte-Generation
- Relplas - Erhöhte Qualitätssicherung von Plasmaprozessen
- Powercare - Cognitive power electronics with integrated failure prediction



Projects

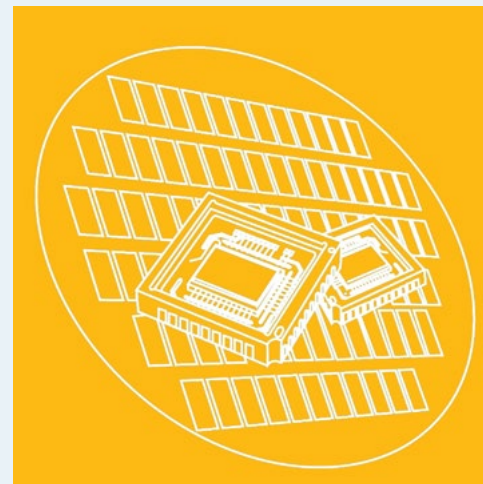
Electronic Energy Sytsems

- Super-HEART - a fault-tolerant and highly efficient energy hub with embedded short-term energy storage for high availability electric power delivery
- Data-fusion for power module C.M. - Simulation-based investigations on the potential of data fusion of T_j and other measured and estimated parameters (R_{th} , V_{ce}) for SoH assessment of power modules.
- Netzdienliche Speicherlösungen BS-Netz - Potenzialstudie netzdienlicher Speicherlösungen im 16,7 Hz – 110 kV-Bahnstromnetz
- ISIT@CAU - Aufbau einer Gruppe elektronische Energiesysteme



Micro Manufaturing

- TROM - Transfer of fabrication process for a switchable e-beam mask
- ATAIR - Voll Integrierte, ungekühlte Wafer-Level FIR-Kamera für Wärmestrahlung
- 3D-ACC HOPE - Process verification for 3D-accelerometer
- Condias-MEMS Elektroden - Herstellung von Wafern mit MEMS-Elektroden für einen Mikro-Ozon-Generator
- Sicoya Entwicklung Reflektorfläche - Entwicklung eines Herstellungsprozesses für Reflektorflächen zur Einkopplung von Licht in optische Wellenleiter
- VIP+ HERMES - Herstellung ultrakompakter MEMS Sensoren mittels laserbasierter Integrationsverfahren
- Si-Glass manifold substrate - Glass-Silicon Manifold Substrate Fabrication for Glass Frit Bonding
- Glas-Si Komposite für NanoSCAN - Entwicklung eines Glas-Si Komposit-Substrats für den Aufbau von Ionenfallen
- DMSonSOI - Dehnungsmessstreifen auf SOI-<110>-Wafern



Imprint

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