

## **Publications from the Technology Platform "MEMS Actuators" of the Research Fab Microelectronics Germany (2021)**

- Poongodan P.K., Sakolski O., Vanselow F., Maurer L. (2021): An 8 Channel Transceiver ASIC to Interface a CMUT Array. In: 2021 19th IEEE International New Circuits and Systems Conference, NEWCAS 2021 (Conference Paper). DOI:10.1109/NEWCAS50681.2021.9462791.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114642544&doi=10.1109%2fNEWCAS50681.2021.9462791&partnerID=40&md5=1b289a05135944ab575fa9ec261af76e>
- Thalhofer T., Busmann A., Durasiewicz C., Hayden O. (2021): Effect of actuation signal on single stroke volume in metal micro diaphragm pumps. In: GMM-Fachberichte, No.98, pp.337-340 (Conference Paper). DOI:.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85117726778&partnerID=40&md5=33f7fc1ae4e6f6ec4dcac1973ee2ed9a>
- Koch, Sandro G.; Völz, Uwe; Lange, Nicolas; Köble, Sören (2021): Empowering Robots for Multimodal Tactile Gripping using Capacitive Micromachined Ultrasonic Transducers. In: Smart Systems Integration, SSI 2021, S.83-87 (Konferenzbeitrag). DOI:10.1109/SSI52265.2021.9467023.  
Link: <http://publica.fraunhofer.de/documents/N-642699.html>
- Grünerbel, Lorenz; Leikam, Barbara; Schrag, Gabriele (2021): Experimental Characterization Method for Passive Microvalves in Diaphragm Pumps for Medical Applications. In: MikroSystemTechnik Kongress 2021, 4 S. (Konferenzbeitrag). DOI:.  
Link: <http://publica.fraunhofer.de/documents/N-644510.html>
- Bußmann A.B., Grünerbel L.M., Durasiewicz C.P., Thalhofer T.A., Wille A., Richter M. (2021): Microdosing for drug delivery application—A review. In: Sensors and Actuators, A: Physical, Art.112820 (Review). DOI:10.1016/j.sna.2021.112820.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85107112753&doi=10.1016%2fj.sna.2021.112820&partnerID=40&md5=6c3de544e449cf5f12d0ea8bb5a99e4a>
- Bußmann A., Thalhofer T., Hoffmann S., Daum L., Surendran N., Hayden O., Hubbuch J., Richter M. (2021): Microfluidic cell transport with piezoelectric micro diaphragm pumps. In: Micromachines, No.12, Art.1459 (Article). DOI:10.3390/mi12121459.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85120356199&doi=10.3390%2fmi12121459&partnerID=40&md5=b18b60dc381623e02f53d081fb684d2a>
- Bußmann A., Korzer P., Wald C. (2021): Optical evaluation of the large signal behaviour of piezoelectric disc actuators to increase the precision of micro diaphragm pumps. In: GMM-Fachberichte, No.98, pp.97-100 (Conference Paper). DOI:.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85117713120&partnerID=40&md5=1f57a23305b735098b5cc62dc87587d1>

Research Fab Microelectronics Germany – MEMS Actuators  
**Publications from the Technology Platform “MEMS Actuators” of the Research Fab  
Microelectronics Germany (2021)**

- Durasiewicz C.P., Güntner S.T., Maier P.K., Hölzl W., Schrag G. (2021): Piezoelectric normally open microvalve with multiple valve seat trenches for medical applications. In: Applied Sciences (Switzerland), No.19, Art.9252 (Article). DOI:10.3390/app11199252.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85116530463&doi=10.3390%2fapp11199252&partnerID=40&md5=07e1e4d0452d574ab368958c19a52bcf>
- Bußmann A., Leistner H., Zhou D., Wackerle M., Congar Y., Richter M., Hubbuch J. (2021): Piezoelectric silicon micropump for drug delivery applications. In: Applied Sciences (Switzerland), No.17, Art.8008 (Article). DOI:10.3390/app11178008.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114473187&doi=10.3390%2fapp11178008&partnerID=40&md5=69f6b9b6bb0f66383bc71b8bba17c744>
- Bußmann A.B., Durasiewicz C.P., Kibler S.H.A., Wald C.K. (2021): Piezoelectric titanium based microfluidic pump and valves for implantable medical applications. In: Sensors and Actuators, A: Physical, Art.112649 (Article). DOI:10.1016/j.sna.2021.112649.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85102481776&doi=10.1016%2fj.sna.2021.112649&partnerID=40&md5=f17861aefad1facb2cd470f8cf122c9c>
- Leistner H., Wackerle M., Congar Y., Anheuer D., Röhl S., Richter M. (2021): Robust silicon micropump of chip size 5x5x0.6 mm<sup>3</sup> with 4 ml/min air and 0.5 ml/min water flow rate for medical and consumer applications. In: GMM-Fachberichte, No.98, pp.113-116 (Conference Paper). DOI:  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114462806&partnerID=40&md5=e291a37a37df322d8c5e9c0d67cba6b9>
- Nebrich, Lars (2021): Sensors & Actuators. Vortrag gehalten bei IoT - Modul 2, Milliarden Dinge und Mehrwert ohne Ende?, 05.05.2021, Online. In: 12 Folien (Vortrag; Elektronische Publikation). DOI:  
Link: <http://publica.fraunhofer.de/documents/N-641081.html>
- Durasiewicz C., Bußmann A., Kibler S. (2021): Titanium micro diaphragm pump for implantable medical applications. In: GMM-Fachberichte, No.98, pp.117-119 (Conference Paper). DOI:  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85117733890&partnerID=40&md5=cea21a79fa811f12098badaae1c1958c>
- Wen Q., He X., Lu Z., Streiter R., Otto T. (2021): A comprehensive review of miniaturized wind energy harvesters. In: Nano Materials Science, Vol.3, No.2, pp.170-185 (Review). DOI:10.1016/j.nanoms.2021.04.001.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85107733331&doi=10.1016%2fj.nanoms.2021.04.001&partnerID=40&md5=835887fee043561ea5ce6425dec913e4>
- Baum M., Meinecke C., Blaudeck T., Helke C., Reuter D., Hiller K., Hermann S., Schulz S.E., Kuhn H. (2021): Bridging the gap: Perspectives of nanofabrication technologies for application-oriented research. In: Journal of Vacuum Science and Technology B: Nanotechnology and Microelectronics, Vol.39, No.6, Art.062805 (Article). DOI:10.1116/6.0001299.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85118868710&doi=10.1116%2f6.0001299&partnerID=40&md5=2f1a2dad570ec7341ab5a319ae3d180>
- Saeidi N., Selvam K.F.R.G.M., De Souza Tortato F., Satwara M., Wiemer M. (2021): Characterization of Capacitive Micromachined Ultrasound Transducer (Cmut) for Targeted Applications in Harsh Environments. In: Proceedings of the IEEE International Conference on Micro Electro Mechanical Systems (MEMS), Vol.2021-January, Art.9375331, pp.903-906 (Conference Paper). DOI:10.1109/MEMS51782.2021.9375331.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85103445133&doi=10.1109%2fMEMS51782.2021.9375331&partnerID=40&md5=6f2ab2c5152d9e215ddd973460814c29>

Research Fab Microelectronics Germany – MEMS Actuators  
**Publications from the Technology Platform “MEMS Actuators” of the Research Fab  
Microelectronics Germany (2021)**

- Bulz D., Weidlich S., Konietzka S., Motl T., Shaporin A., Forke R., Hiller K., Kuhn H. (2021): Compact Standalone North-finding Device based on MEMS Gyroscope and Maytagging. In: 2021 Smart Systems Integration, SSI 2021, Art.9467021 (Conference Paper). DOI:10.1109/SSI52265.2021.9467021.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114204720&doi=10.1109%2fSSI52265.2021.9467021&partnerID=40&md5=39e66e4488405de885486831051933af>
- Stoeckel C., Melzer M., Meinel K., Tavakolibasti M., Forke R., Zimmermann S., Otto T., Kuhn H. (2021): Design and technology for uniform aluminum nitride piezoelectric micromachined ultrasonic transducers with radial array. In: 2021 Smart Systems Integration, SSI 2021, Art.9467017 (Conference Paper). DOI:10.1109/SSI52265.2021.9467017.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114204855&doi=10.1109%2fSSI52265.2021.9467017&partnerID=40&md5=a88b5114198011ecf088a35b05d226fd>
- Meinel K., Stoeckel C., Melzer M., Zimmermann S., Forke R., Hiller K., Otto T. (2021): Piezoelectric Scanning Micromirror with Built-In Sensors Based on Thin Film Aluminum Nitride. In: IEEE Sensors Journal, Vol.21, No.8, Art.9099788, pp.9682-9689 (Article). DOI:10.1109/JSEN.2020.2997873.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85096161340&doi=10.1109%2fJSEN.2020.2997873&partnerID=40&md5=4b781d196656f3eb74614f232cacac89>
- Osipova V., Johrmann N., Heilmann J., May D., Arnold J., Bieniek T., Pufall R., Wunderle B. (2021): Using AFM Measurements for Failure Indication during High-Cycle Fatigue Testing of thin Metal Films on MEMS Cantilevers. In: 2021 22nd International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems, EuroSimE 2021, Art.9410876 (Conference Paper). DOI:10.1109/EuroSimE52062.2021.9410876.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85105557450&doi=10.1109%2fEuroSimE52062.2021.9410876&partnerID=40&md5=7de524c52ccdda8db920f33816077c3>
- Wen Q., He X., Lu Z., Streiter R., Otto T. (2021): A comprehensive review of miniaturized wind energy harvesters. In: Nano Materials Science, Vol.3, No.2, pp.170-185 (Review). DOI:10.1016/j.nanoms.2021.04.001.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85107733331&doi=10.1016%2fj.nanoms.2021.04.001&partnerID=40&md5=835887fee043561ea5ce6425dec913e4>
- Baum M., Meinecke C., Blaudeck T., Helke C., Reuter D., Hiller K., Hermann S., Schulz S.E., Kuhn H. (2021): Bridging the gap: Perspectives of nanofabrication technologies for application-oriented research. In: Journal of Vacuum Science and Technology B: Nanotechnology and Microelectronics, Vol.39, No.6, Art.062805 (Article). DOI:10.1116/6.0001299.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85118868710&doi=10.1116%2f6.0001299&partnerID=40&md5=2f1a2dad570ec7341ab5a319ae3d180>
- Saeidi N., Selvam K.F.R.G.M., De Souza Tortato F., Satwara M., Wiemer M. (2021): Characterization of Capacitive Micromachined Ultrasound Transducer (Cmut) for Targeted Applications in Harsh Environments. In: Proceedings of the IEEE International Conference on Micro Electro Mechanical Systems (MEMS), Vol.2021-January, Art.9375331, pp.903-906 (Conference Paper). DOI:10.1109/MEMS51782.2021.9375331.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85103445133&doi=10.1109%2fMEMS51782.2021.9375331&partnerID=40&md5=6f2ab2c5152d9e215ddd973460814c29>

Research Fab Microelectronics Germany – MEMS Actuators  
**Publications from the Technology Platform “MEMS Actuators” of the Research Fab  
Microelectronics Germany (2021)**

- Bulz D., Weidlich S., Konietzka S., Motl T., Shaporin A., Forke R., Hiller K., Kuhn H. (2021): Compact Standalone North-finding Device based on MEMS Gyroscope and Maytagging. In: 2021 Smart Systems Integration, SSI 2021, Art.9467021 (Conference Paper). DOI:10.1109/SSI52265.2021.9467021.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114204720&doi=10.1109%2fSSI52265.2021.9467021&partnerID=40&md5=39e66e4488405de885486831051933af>
- Stoeckel C., Melzer M., Meinel K., Tavakolibasti M., Forke R., Zimmermann S., Otto T., Kuhn H. (2021): Design and technology for uniform aluminum nitride piezoelectric micromachined ultrasonic transducers with radial array. In: 2021 Smart Systems Integration, SSI 2021, Art.9467017 (Conference Paper). DOI:10.1109/SSI52265.2021.9467017.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114204855&doi=10.1109%2fSSI52265.2021.9467017&partnerID=40&md5=a88b5114198011ecf088a35b05d226fd>
- Meinel K., Stoeckel C., Melzer M., Zimmermann S., Forke R., Hiller K., Otto T. (2021): Piezoelectric Scanning Micromirror with Built-In Sensors Based on Thin Film Aluminum Nitride. In: IEEE Sensors Journal, Vol.21, No.8, Art.9099788, pp.9682-9689 (Article). DOI:10.1109/JSEN.2020.2997873.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85096161340&doi=10.1109%2fJSEN.2020.2997873&partnerID=40&md5=4b781d196656f3eb74614f232cacac89>
- Osipova V., Johrmann N., Heilmann J., May D., Arnold J., Bieniek T., Pufall R., Wunderle B. (2021): Using AFM Measurements for Failure Indication during High-Cycle Fatigue Testing of thin Metal Films on MEMS Cantilevers. In: 2021 22nd International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems, EuroSimE 2021, Art.9410876 (Conference Paper). DOI:10.1109/EuroSimE52062.2021.9410876.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85105557450&doi=10.1109%2fEuroSimE52062.2021.9410876&partnerID=40&md5=7de524c52ccdda8db920f33816077c3>
- Cwalina S., Kottke C., Jungnickel V., Freund R., Runge P., Rustige P., Knieling T., Gu-Stoppel S., Albers J., Laske N., Senger F., Wen L., Giovanneschi F., Altuntac E., Ramesh A.N., Gonzalez-Huici M.A., Kuter A., Reddy S. (2021): Fiber-based frequency modulated LiDAR with MEMS scanning capability for long-range sensing in automotive applications. In: 2021 IEEE International Workshop on Metrology for Automotive, MetroAutomotive 2021 - Proceedings, pp.48-53 (Conference Paper). DOI:10.1109/MetroAutomotive50197.2021.9502868.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114964855&doi=10.1109%2fMetroAutomotive50197.2021.9502868&partnerID=40&md5=d6ae872a223b539d66a44a7ef9e3c050>
- Cwalina S., Kottke C., Jungnickel V., Freund R., Runge P., Rustige P., Knieling T., Gu-Stoppel S., Albers J., Laske N., Senger F., Wen L., Giovanneschi F., Altuntac E., Ramesh A.N., Gonzalez-Huici M.A., Kuter A., Reddy S. (2021): Fiber-based frequency modulated LiDAR with MEMS scanning capability for long-range sensing in automotive applications. In: 2021 IEEE International Workshop on Metrology for Automotive, MetroAutomotive 2021 - Proceedings, pp.48-53 (Conference Paper). DOI:10.1109/MetroAutomotive50197.2021.9502868.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114964855&doi=10.1109%2fMetroAutomotive50197.2021.9502868&partnerID=40&md5=d6ae872a223b539d66a44a7ef9e3c050>

Research Fab Microelectronics Germany – MEMS Actuators  
**Publications from the Technology Platform “MEMS Actuators” of the Research Fab  
Microelectronics Germany (2021)**

- Österlund E., Ross G., Caro M.A., Paulasto-Kröckel M., Hollmann A., Klaus M., Meixner M., Genzel C., Koppinen P., Pensala T., Žukauskaitė A., Trebala M. (2021): Stability and residual stresses of sputtered wurtzite AlScN thin films. In: Physical Review Materials, Vol.5, No.3, Art.035001 (Article). DOI:10.1103/PhysRevMaterials.5.035001.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85104267135&doi=10.1103%2fPhysRevMaterials.5.035001&partnerID=40&md5=56f7d15dff99590577ba612ff90400ef>
- Ambacher O., Christian B., Feil N., Urban D.F., Elsässer C., Prescher M., Kirste L. (2021): Wurtzite ScAlN, InAlN, and GaAlN crystals, a comparison of structural, elastic, dielectric, and piezoelectric properties. In: Journal of Applied Physics, Vol.130, No.4, Art.045102 (Article). DOI:10.1063/5.0048647.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85106698516&doi=10.1063%2f5.0048647&partnerID=40&md5=283d4394d0aca03bddf5830175520a00>
- Goritz A., Wipf S.T., Wietstruck M., Kaynak M., Fraschke M., Kruger A., Lisker M. (2021): BEOL modifications of a 130 nm SiGe BiCMOS technology for monolithic integration of thin-film wafer-level encapsulated D-Band RF-MEMS switches. In: 2021 Symposium on Design, Test, Integration and Packaging of MEMS and MOEMS, DTIP 2021 (Conference Paper). DOI:10.1109/DTIP54218.2021.9568672.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85119065568&doi=10.1109%2fDTIP54218.2021.9568672&partnerID=40&md5=12a9454cc9458131ec1f0d69fb1c5e68>
- Dauderstädt U., Dürr P., Gehner A., Wagner M., Schenk H. (2021): Analog spatial light modulators based on micromirror arrays. In: Micromachines, Vol.12, No.5, Art.483 (Article). DOI:10.3390/mi12050483.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85105706014&doi=10.3390%2fmi12050483&partnerID=40&md5=6e6a8e4e7829ddb3d88b1ecdf6380d36>
- Schenk, H.A.G.; Ehrig, L.; Wall, F.; Kaiser, B.; Stolz, M.; Langa, S.; Schuffenhauer, D.; Monsalve Guaracao, J.M.; Melnikov, A.; Conrad, H. (2021): Balanced electrostatic all-silicon MEMS speakers. In: 149th Audio Engineering Society Convention 2020, S.410-415 (Konferenzbeitrag). DOI:  
Link: <http://publica.fraunhofer.de/documents/N-639553.html>
- Kämpfe, Thomas; Polakowski, Patrick; Seidel, Konrad (2021): Bewegbares Piezoelement und Verfahren zum Herstellen eines bewegbaren Piezoelements. In: (Patent; Elektronische Publikation). DOI:  
Link: <http://publica.fraunhofer.de/documents/N-643133.html>
- Koble S., Krenkel M., Koch S.G., Urbahn C. (2021): Capacitive Micromachined Ultrasonic Transducers (CMUT) Utilized as Tactile Sensors. In: Proceedings of the International Spring Seminar on Electronics Technology, Vol.2021-May, Art.9467603 (Conference Paper). DOI:10.1109/ISSE51996.2021.9467603.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85113970074&doi=10.1109%2fISSE51996.2021.9467603&partnerID=40&md5=0cbf5f77fea408bcf8707f8701e773cc>

Research Fab Microelectronics Germany – MEMS Actuators  
**Publications from the Technology Platform “MEMS Actuators” of the Research Fab  
Microelectronics Germany (2021)**

- Hohle C., Döring S., Friedrichs M., Gehner A., Rudloff D., Schulze M., Stübner R., Trenkler D. (2021): Challenges of monolithic MEMS-on-CMOS integration for spatial light modulators. In: Proceedings of SPIE - The International Society for Optical Engineering, Vol.11697, Art.116970V (Conference Paper). DOI:10.1117/12.2583036.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85107430398&doi=10.1117%2f12.2583036&partnerID=40&md5=bb34abf7f73ab2181fdad5ef428d68b3>
- Melnikov A., Schenk H.A.G., Monsalve J.M., Wall F., Stolz M., Mrosk A., Langa S., Kaiser B. (2021): Coulomb-actuated microbeams revisited: experimental and numerical modal decomposition of the saddle-node bifurcation. In: Microsystems and Nanoengineering, Vol.7, No.1, Art.41 (Article). DOI:10.1038/s41378-021-00265-y.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85106982891&doi=10.1038%2fs41378-021-00265-y&partnerID=40&md5=8f6039b89bd0ccd5d74e18bae78416bd>
- Koch S.G., Volz U., Lange N., Koble S., Schubert F., Richter C., Poongodan P.K., Vanselow F., Urbahn C. (2021): Empowering Robots for Multimodal Tactile Gripping using Capacitive Micromachined Ultrasonic Transducers. In: 2021 Smart Systems Integration, SSI 2021, Art.9467023 (Conference Paper). DOI:10.1109/SSI52265.2021.9467023.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114212257&doi=10.1109%2fSSI52265.2021.9467023&partnerID=40&md5=950e1ec3ceac04a3eb1f8618cad6d1d9>
- Monsalve J.M., Melnikov A., Kaiser B., Schuffenhauer D., Stolz M., Ehrig L., Schenk H.A.G., Conrad H., Schenk H. (2021): Large-Signal Equivalent-Circuit Model of Asymmetric Electrostatic Transducers. In: IEEE/ASME Transactions on Mechatronics (Article). DOI:10.1109/TMECH.2021.3112267.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85117074094&doi=10.1109%2fTMECH.2021.3112267&partnerID=40&md5=2d06de90af88aa192c1783044734fe3b>
- Dürr, Peter; Neudert, Andreas; Felsberg, Linda (2021): MEMS-Aktuator-Element und MEMS-Aktuator-Array mit einer Mehrzahl von MEMS-Aktuator-Elementen. In: (Patent; Elektronische Publikation). DOI:  
Link: <http://publica.fraunhofer.de/documents/N-635821.html>
- Dürr, Peter (2021): MEMS-Aktuator und MEMS-Aktuator-Array mit einer Mehrzahl von MEMS-Aktuatoren. In: (Patent; Elektronische Publikation). DOI:  
Link: <http://publica.fraunhofer.de/documents/N-635823.html>
- Kaiser, Bert; Monsalve Guaracao, Jorge Mario; Conrad, Holger (2021): MEMS component, assembly comprising the MEMS component and method for operating the MEMS component. In: (Patent; Elektronische Publikation). DOI:  
Link: <http://publica.fraunhofer.de/documents/N-635848.html>
- Kaiser, Bert (2021): MEMS component with in-plane movable element and method for operating same. In: (Patent; Elektronische Publikation). DOI:  
Link: <http://publica.fraunhofer.de/documents/N-635908.html>
- Langa, Sergiu; Conrad, Holger; Kaiser, Bert (2021): MEMS mit hohem Aspektverhältnis. In: (Patent; Elektronische Publikation). DOI:  
Link: <http://publica.fraunhofer.de/documents/N-643173.html>

Research Fab Microelectronics Germany – MEMS Actuators  
**Publications from the Technology Platform “MEMS Actuators” of the Research Fab  
Microelectronics Germany (2021)**

- Shashank, Shashank; Narimani, Keyvan; Gaudet, Matthieu; Kaiser, Bert; Conrad, Holger (2021): Mikroelektromechanischer Antrieb zum Bewegen von Objekten. In: (Patent; Elektronische Publikation). DOI:.  
Link: <http://publica.fraunhofer.de/documents/N-643174.html>
- Melnikov A., Michael S., Wall F., Kaiser B., Mrosk A., Schuffenhauer D., Monsalve J., Sergiu L., Schenk H.A.G., Ehrig L., Conrad H., Ahnert M., Schenk H. (2021): Nonlinearity of balanced mems loudspeakers: Optical experiments and numerical modeling using time-harmonic signals. In: "Advances in Acoustics, Noise and Vibration - 2021" Proceedings of the 27th International Congress on Sound and Vibration, ICSV 2021 (Conference Paper). DOI:.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85117514799&partnerID=40&md5=53ebddd9ebd20eb5f60f56e5f1362d56>
- Kämpfe, Thomas (2021): Piezoelektrisches Element und Verfahren zum Herstellen eines piezoelektrischen Elements. In: (Patent; Elektronische Publikation). DOI:.  
Link: <http://publica.fraunhofer.de/documents/N-643136.html>
- Raimondi, V.; Acampora, L.; Amato, G.; Baldi, M.; Berndt, D. (2021): Spatial Light Modulator-Based Architecture to Implement a Super-Resolved Compressive Instrument for Earth Observation. In: IEEE International Geoscience and Remote Sensing Symposium, IGARSS 2021, 4 S. (Konferenzbeitrag). DOI: 10.1109/IGARSS47720.2021.9554343.  
Link: <http://publica.fraunhofer.de/documents/N-642700.html>
- Schweiger S., Koch S.G., Schenk H. (2021): Two-Photon-Lithography Substrate Reflection and Absorption Compensation for Additive Manufacturing of Metamaterials on MEMS. In: Proceedings of the International Spring Seminar on Electronics Technology, Vol.2021-May, Art.9467575 (Conference Paper). DOI:10.1109/ISSE51996.2021.9467575.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85113943765&doi=10.1109%2fISSE51996.2021.9467575&partnerID=40&md5=0a5ba39f6765f9d58ea37553f1efc3ed>
- Michel M., Blaeser S., Zakizade E., Weyers S., Weiler D. (2021): 6 µm microbolometers for uncooled thermal imaging. In: Proceedings of SPIE - The International Society for Optical Engineering, Vol.11866, Art.1186605 (Conference Paper). DOI:10.1117/12.2597969.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85120452257&doi=10.1117%2f12.2597969&partnerID=40&md5=cfbcd1ccd0642e9bb754baf34bbe40>
- Haase J.F., Grollius S., Grosse S., Buchner A., Ligges M. (2021): A 32x24 pixel SPAD detector system for LiDAR and quantum imaging. In: Proceedings of SPIE - The International Society for Optical Engineering, Vol.11693, Art.116930M (Conference Paper). DOI:10.1117/12.2578775.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85105964103&doi=10.1117%2f12.2578775&partnerID=40&md5=11533187ac5c60719f704296dd3369cf>
- Senger F., Gu-Stoppel S., Wen L., Albers J., Timmermann M., Bruns S., Piechotta G., Bünting U., Schulz-Ruhtenberg M. (2021): A 2D circular-scanning piezoelectric MEMS mirror for laser material processing. In: Proceedings of SPIE - The International Society for Optical Engineering, Vol.11697, Art.1169704 (Conference Paper). DOI:10.1117/12.2584075.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85107437361&doi=10.1117%2f12.2584075&partnerID=40&md5=404f4061cf8b35c9b79773f18b63671c>
- Gu-Stoppel S., Senger F., Wen L., Yarar E., Wille G., Albers J. (2021): A design and manufacturing platform for AlScN based highly linear quasi-static MEMS mirrors with large optical apertures. In: Proceedings of SPIE - The International Society for Optical Engineering, Vol.11697, Art.116970F (Conference Paper). DOI:10.1117/12.2583399.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85107425144&doi=10.1117%2f12.2583399&partnerID=40&md5=b85934e658a8ae9283597afa908c1c8c>

Research Fab Microelectronics Germany – MEMS Actuators  
**Publications from the Technology Platform “MEMS Actuators” of the Research Fab  
Microelectronics Germany (2021)**

- Kreutzer T.-N., Fichtner S., Wagner B., Lofink F. (2021): A double-layer MEMS actuator based on ferroelectric polarization inversion in AlScN. In: IEEE International Symposium on Applications of Ferroelectric, ISAF 2021, International Symposium on Integrated Functionalities, ISIF 2021 and Piezoresponse Force Microscopy Workshop, PFM 2021 - Proceedings, Art.9477382 (Conference Paper). DOI:10.1109/ISAF51943.2021.9477382.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114132149&doi=10.1109%2fISAF51943.2021.9477382&partnerID=40&md5=9ff952647f9440847430b6a9c8db1cb4>
- Wolff N., Fichtner S., Haas B., Islam M.R., Niekiet F., Kessel M., Ambacher O., Koch C., Wagner B., Lofink F., Kienle L. (2021): Atomic scale confirmation of ferroelectric polarization inversion in wurtzite-type AlScN. In: Journal of Applied Physics, Vol.129, No.3, Art.034103 (Article). DOI:10.1063/5.0033205.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85099770788&doi=10.1063%2f5.0033205&partnerID=40&md5=91eb791343d408f268d4e5395b6807c1>
- Kostmann C., Lisek T., Bodduluri M.T., Andersen O. (2021): Automated filling of dry micron-sized particles into micro mold pattern within planar substrates for the fabrication of powder-based 3d microstructures. In: Micromachines, Vol.12, No.10, Art.1176 (Article). DOI:10.3390/mi12101176.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85116053983&doi=10.3390%2fmi12101176&partnerID=40&md5=62f8347df30e9df281f9b780ddd44da5>
- Lisek, Thomas; Lofink, Fabian (2021): Ein Verfahren zum Herstellen einer gegenläufig magnetisierten Magnetstruktur. In: (Patent; Elektronische Publikation). DOI:  
Link: <http://publica.fraunhofer.de/documents/N-635824.html>
- Cwalina S., Kottke C., Jungnickel V., Freund R., Runge P., Rustige P., Knieling T., Gu-Stoppel S., Albers J., Laske N., Senger F., Wen L., Giovanneschi F., Altuntac E., Ramesh A.N., Gonzalez-Huici M.A., Kuter A., Reddy S. (2021): Fiber-based frequency modulated LiDAR with MEMS scanning capability for long-range sensing in automotive applications. In: 2021 IEEE International Workshop on Metrology for Automotive, MetroAutomotive 2021 - Proceedings, pp.48-53 (Conference Paper). DOI:10.1109/MetroAutomotive50197.2021.9502868.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114964855&doi=10.1109%2fMetroAutomotive50197.2021.9502868&partnerID=40&md5=d6ae872a223b539d66a44a7ef9e3c050>
- Hoppe M., Schmidtman S., Aßmann C., Honsberg M., Milde T., Schanze T., Sacher J.R., Gu-Stoppel S., Senger F. (2021): High speed external cavity diode laser concept based on a resonantly driven MEMS scanner for the mid-infrared region. In: Applied Optics, Vol.60, No.15, pp.C92-C97 (Article). DOI:10.1364/AO.420041.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85106346874&doi=10.1364%2fAO.420041&partnerID=40&md5=546e30c39d7767dafc3fcf107685a9b9>
- Hoppe M., Schmidtman S., Amann C., Honsberg M., Tatenguem H., Milde T., Schanze T., Sacher J., Gu-Stoppel S., Senger F. (2021): Innovative ECDL design based on a resonant MEMS scanner for ultra-fast tuning in the MIR range. In: Proceedings of SPIE - The International Society for Optical Engineering, Vol.11697, Art.1169709 (Conference Paper). DOI:10.1117/12.2578913.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85107393365&doi=10.1117%2f12.2578913&partnerID=40&md5=63e436f5dbd201043f9cb17cd7705b90>



Research Fab Microelectronics Germany – MEMS Actuators  
**Publications from the Technology Platform “MEMS Actuators” of the Research Fab  
Microelectronics Germany (2021)**

- Petrak O., Schwarz F., Pohl L., Reher M., Janicke C., Przytarski J., Senger F., Albers J., Giese T., Ratzmann L., Blicharski P., Marauska S., Von Wantoch T., Hofmann U. (2021): Laser beam scanning based AR-display applying resonant 2D MEMS mirrors. In: Proceedings of SPIE - The International Society for Optical Engineering, Vol.11765, Art.1176503 (Conference Paper). DOI:10.1117/12.2579695.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85106872480&doi=10.1117%2f12.2579695&partnerID=40&md5=c5cb284100c7341ee16f85a773d5d288>
- Gojdka B., Dankwort T., Nowak M.A., Bodduluri M.T., Ahmed M., Grunzig S., Lofink F. (2021): Magnetically Excited Piezoelectric Energy Harvester for Micropower Supply and Wakeup Applications. In: 21st International Conference on Solid-State Sensors, Actuators and Microsystems, TRANSDUCERS 2021, pp.455-458 (Conference Paper). DOI:10.1109/Transducers50396.2021.9495625.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85114963331&doi=10.1109%2fTransducers50396.2021.9495625&partnerID=40&md5=c52b12d8f7da0ab285660140dc34b1d0>
- Tappertzhofen S., Bette S., Sievers F., Fichtner S., Bröker S., Schmitz-Kempen T. (2021): Sub-micrometer pyroelectric tomography of AlScN films. In: Applied Physics Letters, Vol.118, No.24, Art.242901 (Article). DOI:10.1063/5.0047002.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85107943116&doi=10.1063%2f5.0047002&partnerID=40&md5=81d291640c6031f6021f67744f43eb6f>
- Erbacher K., MacKowiak P., Schiffer M., Lang K.-D., Schneider-Ramelow M., Ngo H.-D. (2021): Investigation of Deep Dry Etching of 4H SIC Material for MEMS Applications Using DOE Modelling. In: Proceedings of the IEEE International Conference on Micro Electro Mechanical Systems (MEMS), Vol.2021-January, Art.9375268, pp.634-637 (Conference Paper). DOI:10.1109/MEMS51782.2021.9375268.  
Link: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85103466706&doi=10.1109%2fMEMS51782.2021.9375268&partnerID=40&md5=33e0a618054867e602edc105adc5bf1b>