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ICT Project no. 318458
SUPERTHEME
 Circuit Stability Under Process Variability and
 Electro-Thermal-Mechanical Coupling

**D1.11: Publishable Version of the Technology
 Implementation Plan**

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Abstract

Within SUPERTHEME initial “Plans for the Use and Dissemination of Knowledge” were included in the proposal and in the Description of Work, and were refined in the confidential deliverable D1.2 “Dissemination and Use Plan” prepared shortly after the beginning of the project. This deliverable reports about the implementation of this plan, both regarding exploitation at the industrial partners within the project and dissemination actions which are also essential for the successful exploitation of the project results. The SUPERTHEME Consortium Agreement included regulations which make sure that dissemination is promoted and that exploitation is not negatively affected by publishing of information which needs to be protected.

SUPERTHEME dissemination actions started with the implementation of the project WWW site at www.supertheme.eu, which among others included sections for the general public and for the members of the Industrial and Scientific Advisory Board of SUPERTHEME. Papers published in peer review journals and at various important conferences are listed together with workshops which were either organized by SUPERTHEME or where SUPERTHEME took part. The most important exploitation path for results from SUPERTHEME has been via the extension of the commercial offerings of the software house GSS. Furthermore, this document also summarizes the internal exploitation at the other industrial partners within the project, namely the semiconductor company ams and the four equipment companies ASML, HQ-D, IBS and LASSE, and at the three academic partners Fraunhofer, Glasgow University, and TU Wien.

At the end of the SUPERTHEME project the Technology Implementation Plan has been prepared both in a public and in a more detailed confidential version. Further information on the dissemination and use of SUPERTHEME results is given in the Final Project Report and in the final confidential deliverables from the workpackages on dissemination and on exploitation, respectively.

1. Introduction

Dissemination and exploitation of the project results is a key activity of any research project. Whereas both have their own importance and their own requirements, it is also critical that exploitation of the project results is not endangered or hindered by too early or otherwise inappropriate publication. In SUPERTHEME both exploitation and dissemination were first promoted by appropriate information and approval procedures agreed upon and laid down in the SUPERTHEME Consortium Agreement. The next step was the definition of an initial plan for the dissemination and use of the project results already in the SUPERTHEME proposal and Description of Work, and the refinement of this plan in a confidential deliverable shortly after the beginning of the project. Dissemination actions planned included among others the project WWW site, publications in journals, conference presentations, workshops, interactions with other projects, and links to teaching. Software results from the project should be used at all partners for internal research and partly for external research projects, and moreover extend the commercial offerings of the software house GSS which is one of the key partners in SUPERTHEME. This document gives an overview of the successful implementation of these plans.

2 SUPERTHEME Use and Dissemination Actions

2.1 Dissemination Actions Carried out in SUPERTHEME

Successful, broad and well targeted dissemination is an essential contribution to the exploitation of the project results. On the other hand it is important to make sure that open dissemination is not negatively affecting commercialization. As mentioned above, this has been achieved by following the procedures laid down in the Consortium Agreement concerning advance information and approval of dissemination actions.

In the following the dissemination actions carried out in SUPERTHEME are summarized, referring to the detailed internal plans described in deliverable D1.2. An important additional channel for dissemination, not mentioned in D1.2, has been the SUPERTHEME WWW, www.supertheme.eu: Whereas its public section has been used for broad distribution of selected information to the open public, via a dedicated protected section additionally all documents classified as “restricted” were made available to the members of the Industrial and Scientific Advisory Board of SUPERTHEME. The final content of the SUPERTHEME WWW is summarized in the restricted deliverable D7.3 “Final Version of SUPERTHEME WWW”.

Scientific Publications and Conference Participations

An excerpt from D1.2 is cited in the following in *italics*: “*Considerable research activities and high-level scientific results are necessary to achieve the objectives of the SUPERTHEME project. This automatically also includes close interactions with the scientific communities in various fields of TCAD, in order to best consider, use, and compare with developments being made elsewhere.*

In consequence, it is vital for the SUPERTHEME project to publish its results at the conferences most important in the field (e.g. SISPAD) and to discuss at these events with the other leading experts in the field. Moreover, publications in leading scientific journals are mandatory to attract attention for the results of the project, in this way also supporting the other dissemination activities outlined below. Partners driving the publication and conference participation actions in SUPERTHEME are primarily the universities and research institutes Fraunhofer IISB, TU Vienna, and Univ. Glasgow.”

Peer-Reviewed Publications

Within SUPERTHEME 8 peer-reviewed papers (including 4 papers from conferences, see below) have been published in renowned journals with a high visibility in the scientific community. The list of the peer-reviewed publications is given in the Appendix.

Conference Contributions

Due to the topics covered by SUPERTHEME, different scientific areas are relevant in terms of participation in conferences. This includes for instance technology-oriented conferences such as the MAM, device simulation-oriented conferences such as the SISPAD, reliability conferences such as the IRPS, or conferences addressing the circuit level such as the ISCAS. Results of SUPERTHEME have been presented at 21 conferences with a total of 23 conference papers (4 of them as peer-reviewed papers in journals). A complete list of the conferences and the SUPERTHEME papers at these conferences is given in the Appendix.

Workshops

An essential part of the SUPERTHEME dissemination strategy has been the organization of or the participation in workshops:

- SUPERTHEME together with the EC FP7 projects TRAMS and MORDRED co-organized the workshop “Variability and Reliability Research in Devices, Circuits, and Systems in Advanced Technologies” linked to ESSCIRC/ESSDERC 2013, on September 20 in Bucharest, Romania. SUPERTHEME contributed with two own presentations plus an invited industrial keynote presentation on variability.
- SUPERTHEME organized the workshop “Variability – from equipment to circuit level” linked to ESSCIRC/ESSDERC 2015, on September 18, 2015, in Graz, Austria. It consisted of six presentations from SUPERTHEME plus three invited presentations from industry and the EC projects MORDRED and MORV, respectively.
- SUPERTHEME presented a poster at the “9th International Nanotechnology Conference on Communication and Cooperation”, held on May 14-17, 2013, in Berlin, Germany
- SUPERTHEME presented two posters at the European Nanoelectronics Forum held on November 27-28, 2013, in Barcelona, Spain.
- SUPERTHEME presented a poster at the European Nanoelectronics Forum held on December 1-2, 2015, in Berlin, Germany

Training of Scientists and Development of Skills in Europe

Another important aspect is the dissemination via development of skills in Europe. SUPERTHEME contributes to this in various respects:

- The research partners in the project (Fraunhofer IISB and EAS, TU Vienna and Univ. Glasgow) employ a considerable share of scientists who join the institutions after their university degrees, gain additional technical and management qualification during their work, under the supervision of senior scientists, and mostly after some years join industry. As far as working on the project, such scientists can in an optimum way transfer knowledge about the application of simulation tools like those developed in SUPERTHEME into the semiconductor industry. In general the regulations in the work contracts with these staff members make sure that although the training and the transfer of application knowledge is beneficial and promoted the IPR of the project partners is protected.
- Whereas Univ. Glasgow and TU Vienna directly educate students, also Fraunhofer IISB (via its close cooperation with the University of Erlangen-Nürnberg) is contributing to the training of graduate and PhD students. This also includes direct participation of these young scientists in the research projects like SUPERTHEME. IPR is protected in a similar way as with other staff members.
- The statistics collected for the Final Report of SUPERTHEME indicate that besides various levels of experienced researchers also 6 PhD students or other junior scientist were involved in SUPERTHEME.

2.2 Status of SUPERTHEME Exploitation

In D1.2 four tasks were outlined for the exploitation within SUPERTHEME: The integration of software with semiconductor simulation programs, the use of enhanced semiconductor simulation programs for own equipment and process development, the use of enhanced semiconductor simulation programs for research projects, and finally commercialization. In the following the status at the end of SUPERTHEME is compared with the plans outlined in D1.2.

Integration of Software with Semiconductor Simulation Programs

Within the SUPERTHEME Workpackage 5 “Software Integration and variation-Aware Compact Models”, relevant background software from the partners and the software modules developed in SUPERTHEME were integrated with each other and with relevant external

commercial software like Sentaurus Process¹. This enabled both the conduction of the benchmark simulations planned in the project and subsequent use for application simulations both by the industrial partners, as outlined below, and by the academic partners Fraunhofer, TU Vienna and Glasgow University in various technology development projects.

Use of the Enhanced Semiconductor Simulation Programs for own Equipment and Process Development

ams

The semiconductor company ams, partner in the project, is one of the key companies for high performance analog semiconductors around the world. Among others this is due to its leading edge products and its efficient and flexible fabrication processes. To support these processes and especially the variety of its products, ams needs advanced process and device simulation tools. Whereas ams primarily uses standard commercial TCAD software, the company has since more than a decade drawn considerable benefit from the active involvement in RTD projects which are dedicated to closing critical gaps in the TCAD software systems available on the market.

Within the SUPERTHEME project ams has defined six benchmarks (B1-4 and D1-2), which were specifically designed to learn about process variability in different technologies of ams's portfolio. The exploitation in each benchmark is proper detailed within the confidential SUPERTHEME deliverable D8.1. Furthermore – as a natural result of SUPERTHEME project – an entire environment of simulation tools and models were developed in order to link process and device simulation.

Equipment companies

The four semiconductor equipment companies ASML, HQ-D, LASSE (formerly Excico) and IBS, partners in the project, derived specifications based both on processes and variations relevant to their equipment, and beyond that derive general specifications for typical equipment for all process steps. The goal for the SUPERTHEME software system is the simulation of the impact of such variations on devices and circuits. As described in the confidential deliverable D8.1, internal exploitation of results from SUPERTHEME at the four equipment companies has been done or enabled as follows:

- ASML: Whereas the primary interest of ASML is in the the impact of the lithography process itself on the feature sizes ("Critical Dimension" CD) and its uniformity (Critical Dimension Uniformity, CDU) across a wafer, the study of the impact of variations in Double Patterning on FinFET based SRAMs led to interesting results that address key performance parameters and its sensitivities to patterning variations. The functionality is interesting for the future development of patterning solutions for logic FEOL, MEOL and BEOL, which are the core business of equipment manufactures.
- HQ-D has primarily benefited from the work on the characterization of its microwave plasma oxidation system and on the extraction of variability data from the equipment. These results significantly contribute to further improvement of the microwave plasma equipment, e.g. in terms of further scaling to smaller dimensions of *More Moore* devices. Furthermore, the methodology and toolbox developed and demonstrated will in various respects be useful for preventive maintenance. The simulation results obtained from the cooperation with Fraunhofer IISB helped to far better understand the geometrical plasma distribution below the used array of plasma sources and thus provided helpful inputs in order to improve uniformity of the overall process. HQ-D will use those results to further optimize their systems.

¹ www.synopsys.com

- Work at and with IBS in SUPERTHEME dealt with the IBS proprietary plasma doping tool, PULSION®. Within SUPERTHEME a much better understanding of and physical models for plasma doping with Arsenic were developed in cooperation with Fraunhofer IISB. The use of these predictive models is of major interest for IBS. At this date, no commercial solution exists to simulate N type plasma doping, and this can be a barrier for customer to integrate plasma doping in semiconductor process flow. The capability to simulate plasma doping profiles gives to IBS a great technical and commercial advantage, for both internal development and customer demonstration.
- Work at and with LASSE in SUPERTHEME dealt with equipment for sub- μ s time-frames. Literature survey and characterization work carried out at LASSE combined with simulation work led to three kinds of exploitation at LASSE:
 - From process integration perspective, the simulation work has been communicated to customers and partners to showcase LASSE simulation capabilities and to answer their request to quantify the impact of key equipment parameters on process integration. Moreover, the experimental data gathered is now used to fine tune designs of experiments and answer customer requests for specific applications.
 - From hardware perspective, the equipment data gathered (energy to pulse duration correlation, stability, etc...) and associated hardware modifications were integrated in an in-house toolbox to be used not only for equipment maintenance and fine-tuning, but also for feasibility experiments for customers (demos) and academic work.

Use of Enhanced Semiconductor Simulation Programs for Research Projects

As foreseen in the Description of Work, background and foreground software developed by Fraunhofer and TU Wien have been interfaced and integrated both with the proprietary software of GU/GSS and with third-party commercial software from the US-based software house SYNOPSYS, which is currently the de-facto industrial standard for Technology Computer Aided Design (TCAD). This has enabled Fraunhofer and TU Wien to utilize in further research those tools which are most suitable, depending on the application problem in question. Selections from the various software tools developed and enhanced as part of this project are among those applied in cooperative projects on sensor development and integration (FP7 project MSP together with ams and others), on modeling of reliability under variability (FP7 project MORV with the SUPERTHEME ISAB members Infineon and IMEC, and others) and on future technologies for lithography with minimum feature sizes (FP7 project CoLiSA.MMP, ECSEL project SeNaTe). The results from SUPERTHEME especially constitute the baseline for the Horizon 2020 project SUPERAID7 (“Stability Under Process Variability for Advanced Interconnects and Devices Beyond 7 nm node”), to be carried out from January 2016 to December 2018 by the SUPERTHEME partners Fraunhofer IISB, GSS, GU and TU Vienna, together with the SUPERTHEME ISAB member CEA/Leti.

Commercialization

Commercialization of the SUPERTHEME results within the field of nanoelectronics is primarily being done via the software house partner GSS. Compatibility with other software is a major selling point for this software house. GSS already works successfully in the TCAD market with device and compact simulation software specifically tailored to dealing with the impact of statistical variations. This software has been extended in SUPERTHEME both by the work carried out by GSS and GU and by the additional options provided by the project partners Fraunhofer IISB and TU Vienna.

GSS is a UK based software company providing complete solutions for Design Technology Co-Optimisation (DTCO), PDK development and exploration and the screening of future technology options. The GSS tool chain integrates predictive TCAD simulations, statistical compact model extraction and high sigma statistical circuit simulation using ‘push button’ cluster-based technology.

Over the course of the project, the research and development enabled by SUPERTHEME has significantly enriched the capabilities of the tool chain (illustrated in **Figure 1**) offered by GSS for commercial customers. The combination of tools enables GSS' customer to accurately model the impact of the combined sources of stochastic and systematic variability from its sources at the atomic level to devices and circuits.

Thanks to the SUPERTHEME project, GSS has benefited from significant R&D, physical model development and the development of automation and productivity tools that has been undertaken in order to fulfil the goals of the project. These have directly impacted on many of the components of the GSS tool chain. In a more general sense GSS has also benefited from the development of interfaces to commercially available external tools such as Sentaurus Proces from Synopsys and Dr.LiTHO produced by Fraunhofer IISB as well as from active collaborations with Fraunhofer IISB, The University of Glasgow and TU Vienna.

During the SUPERTHEME project GSS has undertaken significant software development and R&D activities which have directly impacted the commercial software offerings provided by the company, enabling business development activities and delivering unparalleled capabilities to the global semiconductor industry. In particular the capabilities for process and statistically aware compact modelling, integration of the full tool chain and the development of the Enigma automation and productivity framework have helped to advance the position of GSS from a start-up company to globally recognised and trusted software provider. Due, in no small part, to the capabilities developed during the timescale of the SUPERTHEME project GSS has significantly increased its customer base and has grown by nearly 400%.

During the course of the SUPERTHEME project GSS has been fortunate to benefit from active and fruitful collaborations with the Fraunhofer institutes in both Erlangen and Dresden and with the University partners at both TU Wien and Glasgow University. Specifically, these collaborations have led to jointly developed foreground IP for thermal modelling² and advanced quantum transport simulation which are in the process of being integrated into the GSS GARAND simulator (see deliverable D4.5 for more information).



Fig. 1: Schematic description of GSS Design Technology Co-Optimisation tool chain.

² Wang, L.; Brown, A.R.; Nedjalkov, M.; Alexander, C.; Cheng, B.; Millar, C.; Asenov, A., "3D electro-thermal simulations of bulk FinFETs with statistical variations," in Simulation of Semiconductor Processes and Devices (SISPAD), 2015 International Conference on , vol., no., pp.112-115, 9-11 Sept. 2015

From GSS' perspective the principle route for exploitation of project developed foreground IP is via product and feature development in the software produced by the company.

More information on the software tools and products developed or significantly enhanced within SUPERTHEME is given in the deliverable D8.1.

Conclusions

SUPERTHEME has been very active and successful in the dissemination of its results via the SUPRTHEME WWW site, peer-reviewed publications, conference presentations, workshops, the interaction with the SUPERTHEME Industrial and Scientific Advisory Board, and contributions to teaching. Use of the project has already led to important benefits for the project partners. Commercialization of software results from SUPERTHEME has strongly contributed to the further strengthening of the market position of the software house GSS which is the primary partner for exploitation towards the outside world.

Appendix

1. List of SUPERTHEME Peer-Reviewed Papers
2. List of SUPERTHEME Dissemination Actions
3. List of SUPERTHEME Conference Contributions

TEMPLATE A1: LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS, STARTING WITH THE MOST IMPORTANT ONES

NO.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers ¹ (if available)	Is/Will open access ² provided to this publication?
1	Impact of Self-Heating on the Statistical Variability in Bulk and SOI FinFETs	L. Wang (GU)	IEEE Trans. Electr. Dev.	62	IEEE	Piscataway	2015	pp. 2106-2112	http://dx.doi.org/10.1109/TED.2015.2436351	no
2	The Effects of Etching and Deposition on the Performance and Stress Evolution of Open Through Silicon Vias	L. Filipovic (TUW)	Microelectr. Reliab.	54	Elsevier	Amsterdam	2014	pp. 1953-1958	http://dx.doi.org/10.1016/j.microrel.2014.07.014	no
3	Numerical Evaluation of the ITRS Transistor Scaling	A. Burenkov (Fraunhofer)	J. Comput. Electron.	14	Springer	Berlin	2015	pp. 192-202	http://dx.doi.org/10.1007/s10825-014-0638-0	no
4	Modeling Carrier Mobility in Nano-MOSFETs in the Presence of Discrete Trapped Charges: Accuracy and Issues	S. Amoroso (GSS)	IEEE Trans. Electr. Dev.	61	IEEE	Piscataway	2014	pp. 1292-1298	http://dx.doi.org/10.1109/TED.2014.2312820	no
5	Simulation of Thermo-mechanical Effect in Bulk-silicon FinFETs	A. Burenkov (Fraunhofer)	Mat. Sci. Semicond. Proc.	42	Elsevier	Amsterdam	2015	pp. 242-246	http://dx.doi.org/10.1016/j.mssp.2015.07.022	no

¹ A permanent identifier should be a persistent link to the published version full text if open access or abstract if article is pay per view) or to the final manuscript accepted for publication (link to article in repository).

² Open Access is defined as free of charge access for anyone via Internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

6	Intrinsic stress analysis of tungsten-lined open TSVs	L. Filipovic (TUW)	Microelectr. Rel.	56	Elsevier	Amsterdam	2015	pp. 1843-1848	http://dx.doi.org/10.1016/j.microrel.2015.06.014	no
7	Coupled Simulation to Determine the Impact of across Wafer Variations in Oxide PECVD on Electrical and Reliability Parameters of Through-silicon Vias	E. Baer (Fraunhofer)	Microelectr. Eng.	137	Elsevier	Amsterdam	2015	pp. 141-145	http://dx.doi.org/10.1016/j.mee.2014.11.014	no
8	Decoherence and time reversibility: The role of randomness at interfaces	M. Nedjalkov (TUW)	J. Appl. Phys.	114	AIP	Melville	2013	174902 (7 pages)	http://dx.doi.org/10.1063/1.4828736	no

TEMPLATE A2: LIST OF DISSEMINATION ACTIVITIES

NO.	Type of activities³	Main leader	Title	Date/Period	Place	Type of audience⁴	Size of audience	Countries addressed
2012 and continuous activities								
1	Web	Fraunhofer	www.supertheme.eu	Released November 6, 2102, continuously updated	N/A	Scientific Community, Industry, Civil Society	N/A	International
2	Other	All	Interaction with the Industrial and Scientific Advisory Board	Project period	N/A	Industry, Scientific Community	8 institutions	European
3	Press release	Fraunhofer	Advanced Simulation Tools to Fight Microchip Variations	November 13, 2012	N/A	Medias	N/A	International
2013								
4	Publication	Fraunhofer	Simulations minimize the effect of process variations (published in: Fraunhofer Microelectronic News)	April 2013	N/A	Scientific Community, Industry, Civil Society	N/A	International

³ A drop down list allows choosing the dissemination activity: publications, conferences, workshops, web, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters, Other.

⁴ A drop down list allows choosing the type of public: Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other ('multiple choices' is possible).

5	Conference	Fraunhofer	9th International Nanotechnology Conference on Communication and Cooperation (INC9) (SUPERTHEME overview posters)	May 14-17, 2013	Berlin	Scientific Community, Policy Makers	300	International
6	Conference	Fraunhofer, GSS, GU, TUW	International Conference on Simulation of Semiconductor Processes and Devices (SISPAD) 2013 (2 SUPERTHEME papers)	September 3-5, 2013	Glasgow, UK	Scientific Community	200	International
7	Conference	Fraunhofer	European Nanoelectronics Forum 2013 (SUPERTHEME overview posters)	November 27-28, 2013	Barcelona, Spain	Scientific Community, Policy Makers	300	International
2014								
8	Conference	ams, Fraunhofer, TUW	Materials for Advanced Metallization (MAM) 2014 (1 SUPERTHEME paper)	March 2-5, 2014	Chemnitz, Germany	Scientific Community	100	International
9	Conference	Fraunhofer, GSS, GU	Ultimate Integration on Silicon (ULIS) (1 SUPERTHEME paper)	April 7-9, 2014	Stockholm, Sweden	Scientific Community	100	International
10	Conference	TUW	IEEE International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems (EuroSimE) 2014 (1 SUPERTHEME paper)	April 7-9, 2014	Ghent, Belgium	Scientific Community	300	International
11	Conference	TUW	International Reliability Physics Symposium (IRPS) 2014 (1 SUPERTHEME paper)	June 1-5, 2014	Hawaii, USA.	Scientific Community	300	International
12	Conference	Fraunhofer, IBS	International Conference on Ion Implantation Technology (IIT) 2014 (1 SUPERTHEME paper)	June 26 – July 4, 2014	Portland, USA	Scientific Community	200	International
13	Conference	TUW	International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA) 2014 (1 SUPERTHEME paper)	June 30 – July 4, 2014	Singapore	Scientific Community	200	International
14	Conference	ams, Fraunhofer, GSS, GU, TUW	International Conference on Simulation of Semiconductor Processes and Devices (SISPAD) 2014 (4 SUPERTHEME papers)	September 9-11, 2014	Yokohama, Japan	Scientific Community	200	International

15	Conference	TUW	European Symposium on Reliability of Electron Devices, Failure Physics and Analysis (ESREF) 2014 (1 SUPERTHEME paper)	September 29 – October 2, 2014	Berlin	Scientific Community	200	International
16	Conference	GSS, GU	12th International Conference on Solid-State and Integrated Circuit Technology (ICSICT 2014) (1 SUPERTHEME paper)	October 28-31, 2014	Gunxi	Scientific Community	300	International
2015								
17	Conference	Fraunhofer	E-MRS Spring Meeting 2015 (1 SUPERTHEME paper)	May 11-15, 2015	Lille, France	Scientific Community	750	International
18	Conference	Fraunhofer	IEEE International Symposium on Circuits and Systems (ISCAS) 2015 (1 SUPERTHEME paper)	May 24-27, 2015	Lisbon, Portugal	Scientific Community	1000	International
19	Conference	ams, TUW	VARI 2015, 6th International Workshop on CMOS Variability (1 SUPERTHEME paper)	September 1-4, 2015	Bahia, Brasil	Scientific Community	200	International
20	Conference	GSS, GU	2015 International Workshop on Computational Electronics (IWCE) (1 SUPERTHEME paper)	September 2-4, 2015	West Lafayette, USA	Scientific Community	200	International
21	Conference	Fraunhofer, GSS, GU, IBS, TUW	International Conference on Simulation of Semiconductor Processes and Devices (SISPAD) 2015 (3 SUPERTHEME papers)	September 9-11, 2015	Washington DC, USA	Scientific Community	200	International
22	Conference	Fraunhofer	European Nanoelectronics Forum 2015 (SUPERTHEME overview posters)	December 1-2, 2015	Berlin, Germany	Scientific Community, Policy Makers	300	International
23	Workshop	Fraunhofer, ams, GSS, GU	Public Workshop on Variability (organized by SUPERTHEME)	September 18, 2015	Graz, Austria	Scientific Community, Industry	30	International
24	Conference	TUW	European Symposium on Reliability of Electron Devices, Failure Physics and Analysis (ESREF) 2015 (1 SUPERTHEME paper)	October 5-9, 2016	Toulouse	Scientific Community	200	International

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25	Conference	GSS, GU	Joint International EUROSIO Workshop and International Conference on Ultimate Integration on Silicon (EUROSIO-ULIS) 2016 (1 SUPERTHEME paper)	January 25-27, 2016	Vienna, Austria	Scientific Community	150	International
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List of SUPERTHEME conference papers

2013

SISPAD 2013

- S.M. Amoroso, L. Gerrer, J.M. Sellier, I. Dimov, M. Nedjalkov, S. Selberherr, A. Asenov, Quantum Insights in Gate Oxide Charge-Trapping Dynamics in Nanoscale MOSFETs, in: Simulation of Semiconductor Processes and Devices (SISPAD) 2013, IEEE, p. 25
- P. Evanschitzky, A. Burenkov, J. Lorenz, Double Patterning: Simulating a Variability Challenge for Advanced Transistors in: Simulation of Semiconductor Processes and Devices (SISPAD) 2013, IEEE, p. 105

2014

MAM 2014

- E. Baer, P. Evanschitzky, J. Lorenz, F. Roger, R. Minixhofer, L. Filipovic, R.L. de Orio, S. Selberherr, Coupled Simulation to Determine the Impact of across Wafer Variations in Oxide PECVD on Electrical and Reliability Parameters of Through-silicon Vias, Microelectronic Engineering 137 (2015) 141

ULIS 2014

- L. Wang, A.R. Brown, C. Millar, A. Burenkov, X. Wang, A. Asenov, J. Lorenz, Simulation for Statistical Variability in Realistic 20 nm MOSFET, in: Proceedings of the 15th International Conference on Ultimate Integration on Silicon (ULIS), 2014, p. 5

EuroSimE 2014

- L. Filipovic, R.L. de Orio, S. Selberherr, Process and Reliability of SF₆/O₂ Plasma Etched Copper TSVs, Proceedings EuroSimE 2014

IRPS 2014

- L. Filipovic, R.L. de Orio, S. Selberherr, A. Singulani, F. Roger, R. Minixhofer, Effects of Sidewall Scallops on Open Tungsten TSVs, Proceedings International Reliability Physics Symposium (IRPS) 2014

IIT 2014

- A. Burenkov, J. Lorenz, Y. Spiegel, F. Torregrosa, Simulation of AsH₃ Plasma Immersion Ion Implantation into Silicon, in: Proceedings International Conference on Ion Implantation Technology (IIT) 2014

IPFA 2014

- L. Filipovic, R.L. de Orio, S. Selberherr, Effects of Sidewall Scallops on the Performance and Reliability of Filled Copper and Open Tungsten TSVs, in: Proc. IEEE 21st International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA) 2014, p. 321

SISPAD 2014

- L. Filipovic, F. Rudolf, E. Baer, P. Evanschitzky, J. Lorenz, F. Roger, A. Singulani, R. Minixhofer, S. Selberherr, Three-Dimensional Simulation for the Reliability and Electrical Performance of Through-Silicon Vias, in: Proceedings of Conference on Simulation of Semiconductor Processes and Devices 2014 (SISPAD 2014), p. 341

- J. Lorenz, E. Bär, A. Burenkov, P. Evanschitzky, A. Asenov, L. Wang, X. Wang, A.R. Brown, C. Millar, D. Reid, Simultaneous Simulation of Systematic and Stochastic Process Variations, in: Proceedings of Conference on Simulation of Semiconductor Processes and Devices 2014 (SISPAD 2014), p. 289
- L. Wang, A. R. Brown, M. Nedjalkov, C. Alexander, B. Cheng, C. Millar, A. Asenov, 3D Coupled Electro-Thermal FinFET Simulations Including the Fin Shape Dependence of the Thermal Conductivity, in: Proceedings of Conference on Simulation of Semiconductor Processes and Devices 2014 (SISPAD 2014), p. 269
- X. Wang, D. Reid, L. Wang, A. Burenkov, C. Millar, B. Cheng, A. Lange, J. Lorenz, E. Baer, A. Asenov, Variability-Aware Compact Model Strategy for 20-nm Bulk MOSFETs, in: Proceedings of Conference on Simulation of Semiconductor Processes and Devices 2014 (SISPAD 2014), p. 293

ESREF 2014

- L. Filipovic, S. Selberherr, The Effects of Etching and Deposition on the Performance and Stress Evolution of Open Through Silicon Vias, *Microelectr. Reliab.* 54 (2014) 1953

ICSICT 2014

- L. Wang, A. R. Brown, M. Nedjalkov, C. Alexander, B. Cheng, C. Millar, A. Asenov, 3D Coupled Electro-Thermal Simulations for SOI FinFET with Statistical Variations Including the Fin Shape Dependence of the Thermal Conductivity, 2014 IEEE 12th International Conference on Solid-State and Integrated Circuit Technology (ICSICT 2014), Guilin, China, Oct. 2014

2015

E-MRS Spring Meeting 2015

- A. Burenkov, J. Lorenz, Simulation of Thermo-mechanical Effect in Bulk-silicon FinFETs, *Materials Science in Semiconductor Processing* 42 (2015) 242

ISCAS 2015

- A. Lange, I. Harasymiv, O. Eisenberger, F. Roger, J. Haase, R. Minixhofer, Towards Probabilistic Analog Behavioral Modeling, in: Proc. of 2015 IEEE International Symposium on Circuits and Systems (ISCAS), p. 2728

VARI Conference 2015

- F. Roger, A. Singulani, S. Carniello, L. Filipovic, S. Selberherr, Global Statistical Methodology for the Analysis of Equipment Parameter Effects on TSV Formation, in: Proceedings VARI Conference 2015, p. 39

IWCE 2015

- L. Wang, T. Sadi, M. Nedjalkov, A. R. Brown, C. Alexander, B. Cheng, C. Millar, A. Asenov. An Advanced Electro-Thermal Simulation Methodology For Nanoscale Device, in: Proceedings of IEEE 2015 International Workshop on Computational Electronics (IWCE 2015), p. 1

SISPAD 2015

- A. Burenkov, J. Lorenz, Y. Spiegel, F. Torregrosa, Simulation of Plasma Immersion Ion Implantation into Silicon, in: Proceedings of Conference on Simulation of Semiconductor Processes and Devices 2015 (SISPAD 2015), p. 218

- L. Wang, A. R. Brown, M. Nedjalkov, C. Alexander, B. Cheng, C. Millar, A. Asenov, 3D Electro-Thermal Simulations of Bulk FinFETs with Statistical Variations, in: Proceedings of Conference on Simulation of Semiconductor Processes and Devices 2015 (SISPAD 2015), p. 112
- X. Wang, D. Reid, L. Wang, A. Burenkov, C. Millar, J. Lorenz, A. Asenov, Hierarchical Variability-Aware Compact Models of 20nm Bulk CMOS, in: Proceedings of Conference on Simulation of Semiconductor Processes and Devices 2015 (SISPAD 2015), p. 325

ESREF2015

- L. Filipovic, A.P. Singulani, F. Roger, S. Carniello, S. Selberherr, Intrinsic Stress Analysis of Tungsten-lined open TSVs, *Microelectr. Reliab.* 55 (2015) 1843

2016

EURSOSOI-ULIS 2016

- L. Wang, T. Sadi, M. Nedjalkov, A. R. Brown, C. Alexander, B. Cheng, C. Millar, A. Asenov, Simulation Analysis of the Electro-thermal Performance of SOI FinFETs, in: Proc. of Joint International EUROSOSOI Workshop and International Conference on Ultimate Integration on Silicon (EUROSOSOI-ULIS) 2016