

Scientific Programme

Monday 4 Oct.

10.00 **Plenary Session**

Room A Chair: Prof. Toomas Rang
Opening address, Greetings

10.30-11.00 Invited talk 1
Estonian energy sector today and its future development tasks
Olev Liik, Tallinn University of Technology, Estonia

11.00-11.30 Invited talk 2
Educational Challenges and Strategies in Electronics
Hannu Tenhunen, Royal Institute of Technology Stockholm, Sweden

11.30-12.00 Invited talk 3
Perspectives on Scaling Theory and CMOS Technology – Punctuated Equilibrium and Evolutionary Biology
Daniel Foty, Gilgamesh Associates, USA

12.00-12.30 *Coffee*

12.30-13.00 Invited talk 4
Design Considerations for Direct Conversion Zero-IF Receivers in Handheld Digital Video Broadcasting Devices
Thomas Nicolay, Saarland University, Germany

13.00-13.30 Invited talk 5
Realistic Fault Models for Defects in Electronic Circuits
Michel Renovell, LIRMM, Montpellier, France

Transferred:
Wed. 6. Oct.
9:00-9:40
room A

Invited talk 6
System Design Challenges in Ubiquitous Computing Environments
Manfred Glesner, Thomas Hollstein, Tudor Murgan, Darmstadt University of Technology, Germany

14.00-15.00 *Lunch*

12.00-17.00 **Tutorial**

Room D **Advanced topics of thermal testing of digital Circuits**

12.00-14.00 **Measurement, modeling and simulation of thermal dynamics in microelectronic structures**
A. Poppe, Budapest Univ. of Technology and Economics, Hungary

14.00-15.00 *Lunch*

15.00-17.00 **Inverse Heat Conduction Problems in Microelectronics with Special Consideration of Analytical Thermal Analysis Methods**
M. Janicki, University of Lodz, Poland

15.00-17.00 **Student Session**

Room C Chair: Prof. Peeter Ellervee

Monday 4 Oct.

15.00-17.00 **1. Electronic Materials, Devices,
and Simulation**
Room A

SESSION 1-1: **Electronic Materials and Devices**

Chair: Prof. Enn Velmre

- 15.00-15.20 **LOCOS Technology Simulation**
J. Anilionienė, R. Anilionis, T. Keršys, Kaunas University of Technology, Lithuania
- 15.20-15.40 **Computer models of surface acoustic wave devices**
R. Budrevicius, S. Rupkus, A. Janeliauskas, Kaunas University of Technology, Lithuania
- 15.40-16.00 **Numerical Study of Turn-off Phenomenon in Complementary 4H-SiC JBS Rectifiers**
T. Rang¹, R. Kurel¹, G. Higelin², ¹Tallinn Univ. of Technology, Estonia, ²University of Applied Sciences Furtwangen, Germany
- 16.00-16.20 **Analysis of the basic Schottky parameters for diffusion-welded aluminium contacts to p- and n-type SiC**
O. Korolkov, J. Ljutov, N. Kuznetsova, J. Ruut, and T. Rang, Tallinn University of Technology, Estonia
- 16.20-16.40 **Ab initio study of GaN properties using VASP software package**
M. Klopov, A. Kuusk, E. Velmre, A. Udal, Tallinn University of Technology, Estonia
- 16.40-17.00 **Study of Radiative Recombination Influence in GaN and GaAs Bipolar Transistor Structures**
E. Velmre, A. Udal, I. Verbitski, Tallinn Univ. of Technology, Estonia

15.00-17.20 **7. Power Electronics**

Room B Chair: Prof. Tõnu Lehtla

- 15.00-15.20 **Renovation of 30 Years Old Dragline Drive System**
L. Kuusk, Tallinn University of Technology, Estonia
- 15.20-15.40 **Starting Processes of Experimental Frequency Controlled Electrical Drive**
R. Jansikene, L. Liivik, Tallinn University of Technology, Estonia
- 15.40-16.00 **Development of Control and Diagnostics System for Tallinn Trams**
A. Rosin, E. Pettai, T. Lehtla, Tallinn Univ. of Technology, Estonia
- 16.00-16.20 **Control System for Electric Traction Drive**
Madis Lehtla, Juhan Laugis, Tallinn Univ. of Technology, Estonia
- 16.20-16.40 **Compact design of a power circuit for a dual-output voltage converter**
Dmitri Vinnikov, Tõnu Lehtla, Tallinn Univ. of Technology, Estonia
- 16.40-17.00 **A Speed Measurement Method in the Model Drive with Field-Oriented Control**
Vitali Boiko, Juhan Laugis, Tallinn Univ. of Technology, Estonia
- 17.00-17.20 **Voltage power line conditioner VPLC – input power factor correction solutions**
R. Strzelecki¹, G. Benysek², M. Jarnut², ¹Gdynia Maritime University, Poland, ²University of Zielona Gora, Poland

Tuesday 5 Oct.

9.00-11.00 **1. Electronic Materials, Devices,
and Simulation**
Room A

SESSION 1-2: **Electron-optical Devices and Electronic Systems**

Chair: Dr. Andres Udal

- 9.00- 9.20 **Mathematical model of aberrations in modern Cathode Ray Tubes (CRT)**
O. Zimarinas, Kaunas University of Technology, Lithuania
- 9.20- 9.40 **Modelling of Asymmetric Electronic Optical System**
P. Tarvydas, V. Markevicius, A. Noreika, Kaunas University of Tehnology, Lithuania
- 9.40-10.00 **Magnetic Field Interpolation in 3D Space**
D. Navikas, P. Tarvydas, A. Noreika, Kaunas University of Tehnology, Lithuania
- 10.00-10.20 **Efficiency of Rapidly Ageing Electronic Systems**
P. Balaišis, D. Eidukas, A. Besakirskas, P. Tervydis, Kaunas University of Technology, Lithuania
- 10.20-10.40 **Efficiency of Algorithms of Information System Operation**
N. Bagdanavicius, A. Besakirskas, A. Žickis, E. Keras, Kaunas Univ. of Technology, Lithuania
- 10.40-11.00 **Analysis of home information network technologies**
D. Eidukas, Š. Kilius, A. Valinevicius, Kaunas University of Technology, Lithuania

11.00-11.30 *Coffee*

11.30-13.30 **5. Telecommunication and Optical
Transmission**
Room A

SESSION 5-1

Chair: Dr. Thomas Nicolay

- 11.30-11.50 **Multibeam sonar and sounding signals**
Julia Derkats, Tallinn University of Technology, Estonia
- 11.50-12.10 **Sidescan sonar with high resolution**
A. Gavrijaševa, Tallinn University of Technology, Estonia
- 12.10-12.30 **Improved mobile positioning algorithm based on Cell ID**
Ritvars Krievs, Riga Technical University, Latvia
- 12.30-12.50 **Dynamical Location Update Model for Mobile Objects**
I. Lagzdinyte, A. Budnikas, Kaunas Univ.of Technology, Lithuania
- 12.50-13.10 **Sensitivity of non-coherent frequency shift keying to harmonic interference**
A. Meister, P. Martverk, E. Lossmann, Tallinn University of Technology, Estonia
- 13.10-13.30 **Preconditions for DVB Rollout in Lithuania**
R. Migonis, V. Knyva, A. Citavicius, Kaunas University of Technology, Lithuania

13.30-15.00 *Lunch*

Tuesday 5 Oct.

9.00-10.20 **3. Instrumentation and System**

Room B

Design

SESSION 3-1: **Networking and Control**

Chair: Prof. Jaroslav Roztocil

- 9.00-9.20 **HiNoC: A Flexible Multi-mode Transmission Network -on-Chip Platform**
Thomas Hollstein, Heiko Zimmer, Simon Hohenstern, and Manfred Glesner, Darmstadt University of Technology, Germany
- 9.20-9.40 **Optimization of FSMs network by new encoding strategy**
E. Fomina, A. Sudnitson, and R. Vasilyev, Tallinn University of Technology, Estonia
- 9.40-10.00 **Control and Remote Monitoring of Alternative Energy Sources**
J. Roztocil, B. Šourek, R. Špinar, P. Tymi, Czech Technical University in Prague, Czech Republic
- 10.00-10.20 **Investigation of resonance suppression possibilities in a helical system**
Julius Skudutis, Vladislavas Daskevicius, VGTU, Lithuania

11.00-11.30 *Coffee*

11.30-13.30 **3. Instrumentation and System**

Room B

Design

SESSION 3-2: **Fuzzy and Neuro Systems**

Chair: Prof. Tadeusz Dobrowiecki

- 11.30-11.50 **Generic membership function and its application to Fuzzy modeling**
Andri Riid, Raul Isotamm and Ennu Rüstern, Tallinn University of Technology, Estonia
- 11.50-12.10 **Energy Efficiency Through Neuromorphism**
Jani Mäkipää, Markku Åberg, Technical Research Center of Finland, Finland
- 12.10-12.30 **Logic-level synthesis in cell-based design of analogue fuzzy hardware**
A. Wielgus, Warsaw University of Technology, Poland
- 12.30-12.50 **A learning fuzzy nonlinear filter**
Ye. Bodyanskiy, I. Kokshenev, V. Kolodyazhnyi, Kharkiv National University of Radioelectronics, Ukraine
- 12.50-13.10 **Experiments in Neural Network Inverse Modelling Based Control for a Class of Nonlinear Systems**
E. Petlenkov, E. Rüstern, Tallinn Univ. of Technology, Estonia
- 13.10-13.30 **On-line identification and adaptive control of nonlinear systems using neural networks**
K. Vassiljeva, E. Rüstern, Tallinn Univ. of Technology, Estonia

13.30-15.00 *Lunch*

Tuesday 5 Oct.

9.00-10.20 **4. Test, Diagnostics, and Fault**

Room C

Tolerance

SESSION 4-1: **BIST and System Testing**

Chair: Dr. Jaan Raik

- 9.00-9.20 **Influence of the Test Lengths on Area Overhead in Mixed-Mode BIST**
Petr Fišer, Hana Kubátová, Czech Technical University in Prague, Czech Rep.
- 9.20-9.40 **Hybrid Functional BIST for Digital Systems**
N. Mazurova, J. Smahtina, R. Ubar, Tallinn University of Technology, Estonia
- 9.40-10.00 **Wrapper Connection Technique for Embedded Cores**
Marcel Balá, Elena Gramatová, Institute of Informatics of the Slovak Academy of Sciences, Slovakia
- 10.00-10.20 **An Extended Formalisation in the PMC System Model for Faulty Units Identification**
M. Mánik, E. Gramatová, Institute of Informatics of the Slovak Academy of Sciences, Slovakia

11.00-11.30 *Coffee*

11.30-13.30 **4. Test, Diagnostics, and Fault**

Room C

Tolerance

SESSION 4-2: **Fault Simulation and Test Generation**

Chair: Prof. Raimund Ubar

- 11.30-11.50 **Environment for Fault Simulation Acceleration on FPGA**
Peeter Ellervee, Jaan Raik, Valentin Tihomirov, Tallinn University of Technology, Estonia
- 11.50-12.10 **Topological method of fault simulation**
V.I. Hahanov, O.V. Melnikova, I.V. Hahanova, H.L. Chamyan, KHNURE, Ukraine
- 12.10-12.30 **Comparative Analysis of Sequential Circuit Test Generation Approaches**
J. Raik, A. Krivenko, R. Ubar, Tallinn University of Technology, Estonia
- 12.30-12.50 **Evolutionary approach to the functional test Generation for digital circuits**
Y.A. Skobtsov¹, D.E. Ivanov², V.Y. Skobtsov², R. Ubar³, ¹DNTU, Ukraine, ²Institute of Applied Mathematics and Mechanics of NAS of Ukraine, Ukraine, ³Tallinn University of Technology, Estonia
- 12.50-13.10 **On Using Genetic Algorithm for Test Generation**
M. Brik, J. Raik, R. Ubar, E. Ivask, Tallinn University of Technology, Estonia
- 13.10-13.30 **Testing of hard to detect faults**
M. Janciukas, E. Bareiša, Kaunas Univ. of Technology, Lithuania

13.30-15.00 *Lunch*

Tuesday 5 Oct.

15.00-17.00 **5. Telecommunication and Optical**

Room A

Transmission

SESSION 5-2

Chair: Dr. Aimur Raja

- 15.00-15.20 **Complex amplitude-phase manipulated probe signals**
I. Mürsepp, Tallinn University of Technology, Estonia
- 15.20-15.40 **A 16-QAM Direct Conversion FM/AM Modulator Concept for Microwave Short-Range Communications**
Thomas Nicolay, M. Schmitt, M. Kirsch, Saarland University, Germany
- 15.40-16.00 **Low Power Consuming, Low Noise, Zero-IF Direct Conversion Receiver for Digital Audio System DAB**
Th. Nicolay¹, H.-W. Groh², ¹Saarland University, Germany, ²Atmel Germany GmbH, Germany
- 16.00-16.20 **Analysis of the Multi-service Traffic over Frame Relay**
R. Rindzevicius, J. Gvergzdys, V. Pilkauskas, Kaunas University of Technology, Lithuania
- 16.20-16.40 **Traffic prediction in mobile networks using neural network applications**
G. Rutka, Riga Technical University, Latvia
- 16.40-17.00 **The Aggregate for Telecommunication System Analysis**
A. Zvioniene, R. Rindzevicius, Z. Navickas, Kaunas University Of Technology, Lithuania

15.00-16.20 **3. Instrumentation and System**

Room B

Design

SESSION 3-3: **Embedded Systems**

Chair: Prof. Jüri Vain

- 15.00-15.20 **SoC based mobile robot telecontrol system**
A. Kuusik, Tallinn University of Technology, Estonia
- 15.20-15.40 **Analyzing SystemC^{FL} Designs Using Timed Automata**
K.L. Man, Eindhoven University of Technology, The Netherlands
- 15.40-16.00 **Electronics for Fully Digital Compass**
J. Vcelák, Czech Technical University in Prague, Czech Republic
- 16.00-16.20 **Formal Safety Validation of Mobile Robot Teleoperation**
J. Vain¹, S. Suzuki², A. Kuusik³, ¹Tallinn University of Technology, Estonia, ^{2,3}Tokyo Denki University, Japan

Tuesday 5 Oct.

15.00-17.00 **4. Test, Diagnostics, and Fault**

Room C

Tolerance

SESSION 4-3: **Analog Test and Educational Aspects of Testing**

Chair: Prof. Peeter Ellervee

- 15.00-15.20 **Efficient Defect Detection in Analog and Mixed-signal ICs by Neural Network-based Analysis using Wavelet Decomposition**
V. Stopjaková, P. Malošek, M. Matej, and V. Nagy, Slovak University of Technology, Slovakia
- 15.20-15.40 **Harmonic signal generation with a high spectral purity for high speed ADC testing**
M. Komárek, V. Pape, J. Rztocil, D. Varga, CTU, Czech Republic
- 15.40-16.00 **TeDiAC: the CAD Tool for Studying Approaches to Test and Diagnosis of Analogue Circuits**
Sergey G. Mosin, VSU, Russia
- 16.00-16.20 **Diagnostic Software with WEB Interface for Teaching Purposes**
V. Vislogubov, A. Jutman, H. Kruus, E. Orasson, J. Raik, R. Ubar, Tallinn University of Technology, Estonia
- 16.20-16.40 **BIST Learning Applet**
T. Pikula, R. Lauko, Institute of Informatics, SAS, Slovakia
- 16.40-17.00 **Practical Teaching of the Test Access**
Zdenek Pliva, Technical University of Liberec, Czech Republic

9.00-17.00 **Tutorial**

Room D

Advanced topics of SOC design and test

- 9.00-11.00 **Networks on Chip (NoC): a new paradigm for SoC Design**
S. Kumar, Jönköping University, Sweden
- 11.00-11.30 *Coffee*
- 11.30-13.30 **Networks on Chip (NoC): a new paradigm for SoC Design**
S. Kumar, Jönköping University, Sweden
- 13.30-15.00 *Lunch*
- 15.00-17.00 **BIST in SOC**
Z. Pliva, Technical University of Liberec, Czech Republic

Wednesday 6 Oct.

9.00-9.40 **Invited Talk 6**

Room A

9.00-9.40 **System Design Challenges in Ubiquitous Computing Environments**
Manfred Glesner, Thomas Hollstein, Tudor Murgan,
Darmstadt University of Technology, Germany

10.00-11.00 **5. Telecommunication and Optical**

Room A

Transmission

SESSION 5-3

Chair: Dr. Avo Ots

10.00-10.20 **ON/OFF Voice Sources Model for Analysis of VoIP Transmission in Data Networks**

P. Tervydis, R. Rindzevicius, Kaunas University of Technology,
Lithuania

10.20-10.40 **Policy based Management for Enterprise and Carrier ATN Networking**

Rudolf Volner, Ph.D., Petr Boreš, Ph.D., Czech Technical
University in Prague, Czech Republic

10.40-11.00 **Solving Electrodynamics Problems by Reproducing Transformations Method**

Svetlana V. Chumachenko, Kharkov National University of
Radio Electronics, Ukraine

11.00-11.30 *Coffee*

9.00-16.00 **Tutorial**

Room D

Advanced topics of digital and analog test

9.00-10.00 **Defect Analysis and Probability Evaluation for Test Improvement**

W. Pleskacz, Warsaw University of Technology Poland

10.00-11.00 **Current-based Test Methods for Digital and Mixed-signal Circuits**

V. Stopjakova, Slovak University of Technology

11.00-11.30 *Coffee*

11.30-12.30 **Test Generation for Delay Fault Testing**

E. Gramatová, Institute of Informatics of the Slovak Academy
of Sciences

12.30-14.00 *Lunch*

14.00-15.00 **Design-for-testability of analogue and mixed-signal circuits**

S. Mosin, Vladimir State Technical University, Russia

15.00-16.00 **Electrical test is not enough**

B. Magnhagen, Jönköping University, Sweden

Wednesday 6 Oct.

9.00-11.00 **3. Instrumentation and System**

Room B

Design

SESSION 3-4: **Biomedical Systems**

Chair: Prof. Kalju Meigas

9.00-9.20 **Determination of symmetry axis on human brain CT image**

D. Grigaitis, E. Zitkevicius, A. Usinskas, Vilnius Gediminas
Technical University, Lithuania

9.20-9.40 **Detection of human brain ischemic stroke region by computed tomography image spectrum**

E. Zitkevicius, R. Martavicius, Vilnius Gediminas Technical
University, Lithuania

9.40-10.00 **Acoustic modelling of scattering from Shell-encapsulated gas bubbles**

A. Kvikliene, A. Kopustinskas, Kaunas Univ. of Technology, Lithuania

10.00-10.20 **Heart bioimpedance 3D FDM modelling with anisotropic tissue properties**

R. Gordon, Tallinn University of Technology, Estonia

10.20-10.40 **Improvement of switching lock-in signal conversion in bioimpedance analysers**

T. Parve, R. Land, M. Min, G. Poola, Tallinn University of
Technology, Estonia

10.40-11.00 **Modeling of the PLL-based Bioimpedance Measurement System**

Toivo Paaule, Mart Min, Tallinn Univ. of Technology, Estonia

11.00-11.30 *Coffee*

11.30-13.10 **3. Instrumentation and System**

Room B

Design

SESSION 3-5: **Measurement**

Chair: Prof. Mart Min

11.30-11.50 **Potentialities of Total Harmonic Distortion Measurement Techniques**

A. Citavicius, V. Knyva, Kaunas Univ. of Technology, Lithuania

11.50-12.10 **Optimal Measurements of Linear Approximation to Volterra TITO Systems**

T.P. Dobrowiecki¹, J. Schoukens², ¹BUTE, Hungary, ²Dienst
ELEC, VUB, Belgium

12.10-12.30 **Data acquisition module for interferometric optical spectrum analyzer**

T. Tõnnisson, L. Kuusik, Interspectrum OU, Estonia

12.30-12.50 **1D high precision interferometer-controlled comparator**

S. Kausinis¹, A. Jakstas¹, J. Fluegge², R. Barauskas³,
¹KTU, Lithuania, ²Physikalisch-Technische Bundesanstalt,
Germany, ³KTU, Lithuania

12.50-13.10 **One bio-medical multisine measurement task: solution principles**

A. Ronk, M. Min, Tallinn University of Technology, Estonia

Wednesday 6 Oct.

9.50-11.10 **2. Integrated Electronics and Chip Design**

Room C

SESSION 2-1

Chair: Dr. Eiko Kängsep

9.50-10.10 Fully Integrated Clock Generating PLL Using Low Frequency Reference Signal

L. Aaltonen, M. Saukoski and K. Halonen, Helsinki University of Technology, Finland

10.10-10.30 Fully Integrated Charge Sensitive Amplifier for Readout of Micromechanical Capacitive Sensors

Mikko Saukoski¹, Teemu Salo², Kari Halonen¹, ¹Helsinki University of Technology, Finland, ²VTI Technologies Oy, Finland

10.30-10.50 A 10-bit 320 MS/s 170 mW 0.35- μ m BiCMOS Time-Interleaved Pipeline A/D Converter

Jaana Riikonen, Mikko Aho, Väinö Hakkarainen, Kari Halonen, Helsinki University of Technology, Finland

10.50-11.10 A Current-Mode Implementation for Trapezoidal Fuzzy Membership Function

L. Vesalainen¹, J. Poikonen^{1,2}, A. Paasio¹, ¹University of Turku, Finland, ²Turku Centre for Computer Science TUCS, Finland

11.00-11.30 *Coffee*

11.30-12.50 **2. Integrated Electronics and Chip Design**

Room C

SESSION 2-2

Chair: Prof. Vello Kukk

11.30-11.50 Cell Structure for a Capacitively Coupled Binary CNN

J. Flak¹, M. Laiho^{1,2}, A. Paasio², K. Halonen¹, ¹Helsinki University of Technology, Finland, ²University of Turku, Finland

11.50-12.10 A calibration algorithm for current-steering DACs with relaxed design requirements

G.I. Radulov¹, J.A. Hegt¹, P.J. Quinn², and A. van Roermund¹, ¹Eindhoven University of Technology, the Netherlands, ²Mixed Signal Design Group, Xilinx, Ireland

12.10-12.30 Predictive LUT indexing in a RF predistortion system

Ilari Teikari, Jouko Vankka, Kari Halonen, Helsinki University of Technology, Finland

12.30-12.50 VHDL Front-End for High-Level Synthesis Tool xTractor

Eero Ivask, Peeter Ellervee, Tallinn University of Technology, Estonia

Post-Graduate Student Session

The session gives graduate students a possibility to present their ongoing research topics, and to get feedback from scientists and fellow students.

Monday, October 4, 2004, 15:00-17:00, Room C

Chair: Prof. Peeter Ellervee

15.00-15.10 A Compact DSP Performance Testing System for the Academia

Andres Mellik, Tallinn University of Technology, Estonia

15.10-15.20 Mini-measuring system with dynamic software adjustment based on zooming delta-sigma ADC

Vladimir Kaulio, Saint-Petersburg State Polytechnical University, Russia

15.20-15.30 Moving studies to e-environments B the approach of e-EDU

Tarmo Robal, Tallinn University of Technology, Estonia

15.30-15.40 Creating Graphs for Optimization Tasks

Indrek Roosileht, Tallinn University of Technology, Estonia

15.40-15.50 Heuristic Algorithms for Weighted Graph Partitioning

Allan Aasma, Tallinn University of Technology, Estonia

15.50-16.00 Sorting of bite vectors with help of self-organizing maps algorithm

Uljana Boiko, Tallinn University of Technology, Estonia

16.00-16.10 Deductive Fault Simulation on Structurally Synthesized BDDs

Margit Aarna, Raimund Ubar, Jaan Raik, Tallinn University of Technology, Estonia

16.10-16.20 Graphical User Interface for Turbo Tester Toolset

Elmet Orasson, Tallinn University of Technology, Estonia

16.20-16.30 Towards a biomimetic EAP robot

Mart Anton, Andres Punning, Alvo Aabloo, Madis Listak, Maarja Kruusmaa, Tartu University, Estonia

16.30-16.40 An Underwater Vehicle Able to Follow a Bottom Profile Using the Sonar

Deivid Pugal, Tartu University, Estonia

16.40-16.50 Buoyancy Control of a Semiautonomous Underwater Vehicle for Environmental Monitoring in Baltic Sea

Andrei Maksimov, Tallinn University of Technology, Estonia

16.50-17.00 The Development of Structures with Two-Terminal Elements on the Basis of Negative Differential Resistance and Current-Providing Charge Distribution

Rainer Taniloo, Tallinn University of Technology, Tartu Aviation College, Estonia