

Wednesday, December 10, 2003

WP1: GaN Optoelectronics and LED Lighting - 1:30pm - 3:30pm

Chairpersons: *Andrew Steckl and Janet Pan*

Meeting Room: *Mirage I*

- 1:30pm - 2:00pm **WP1-01 *Invited***
LEDs for Illumination: Past, Present and Future
Chris Bohler, GELcore LLC
- 2:00pm - 2:30pm **WP1-02 *Invited***
High-Power GaN-based LEDs for Lighting and Display Applications
S.A. Stockman, A.Y. Kim, M. Misra, P. Grillot, L. Cook, S. Watanabe, R. Mann, L. Hudson, W. Götz, M.R. Krames, D. Steigerwald, P.S. Martin, F. Wall, F. Steranka,
- 2:30pm - 2:50pm **WP1-03**
Enhanced Blue Emission from Tm-doped Al_xGa_{1-x}N Electroluminescent Thin Films
D.S. Lee and A.J. Steckl, University of Cincinnati, USA, U. Hömmerich and E.E. Nyein,
- 2:50pm - 3:10pm **WP1-04**
Experimental Analysis and a New Model for the High Ideality Factors in GaN-Based
J.M. Shah, Y.-L. Li, Th. Gessmann, and E.F. Schubert, Rensselaer Polytechnic Institute
- 3:10pm - 3:30pm **WP1-05 *Student****
ZnO-based Metal-insulator-semiconductor UV Light-emitting Diodes Prepared by Ion Implantation
Y.I. Alivov, V.I. Zinenko, and Y.A. Agafonov, Institute of Microelectronics Technology, Russia, M.V. Chukichev, Moscow State University, Russia, D.C. Look, Wright State University, USA, B.M. Ataev and V.V. Mamedov, Institute of Physics, Russia, and V.A. Nikitenko, Moscow State University of Railway Engineering

* = *Nominated for the Best Student Paper Award*

WP2: SiGe HBT's and Quantum Devices - 1:30pm - 3:30pm

Chairpersons: John Cressler and Wilfrid Haensch

Meeting Room: Mirage II

- 1:30pm - 1:50pm **WP2-01 *Student***
On the Scaling Limits of Low-Frequency Noise in SiGe HBTs
J. Johansen, Z. Jin, J. D. Cressler, Y. Cui, and G. Niu, Auburn University, USA, Q. Liang, J.-S. Rieh, G. Freeman, D. Ahlgren, and A. Joseph, IBM Microelectronics, USA
- 1:50pm - 2:10pm **WP2-02**
Degradation and Recovery of SiGe HBTs Following Radiation and Hot-carrier Stressing
S.R. Sheng, Dalhousie University, Canada, S.P. McAlister and J.P. McCaffrey, Institute for National Measurement Standards, Canada, National Research Council for Canada, S.J. Kovacic, SiGe Semiconductor Inc.
- 2:10pm - 2:30pm **WP2-03**
Buried Oxide Thickness Effect and Lateral Scaling of SiGe HBT on SOI Substrate
S.T. Chang, Y.H. Liu, and C.W. Liu, Chung Yuan Christian University and Electronics Research and Service Organization
- 2:30pm - 2:50pm **WP2-04**
Integratable SiGe Phototransistor with High Speed (BW = 3GHz) and Extremely-High Avalanche Responsibility
Z. Pei, J.-W. Shi, Y.-M. Hsu, F. Yuan, C.-S. Liang, C.W. Liu, T.-M. Pan, S.C. Lu, W.-Y. Hsieh and M.-J. Tsai, Electronics Research and Service Organization
- 2:50pm - 3:10pm **WP2-05**
Si/SiGe Terahertz Quantum Cascade Emitters
D.J. Paul, S.A. Lynch, and P. Townsend, University of Cambridge, United Kingdom, Z. Ikonik, R.W. Kelsall, and P. Harrison, University of Leeds, United Kingdom, S.L. Liew, D.J. Norris, and A.G. Cullis, University of Sheffield, United Kingdom, J. Zhang, Imperial College of Science, United Kingdom, H.S. Gamble, Queens University Belfast, United Kingdom, and W.R. Tribe and D.D. Arnone, TeraView Ltd.

3:10pm - 3:30pm **WP2-06 Student***
Monolithically Intergrated Si/SiGe Resonant Interband Tunneling Diodes/CMOS
MOBILE Latch with High Voltage Swing
*Stephen Sudirgo, Rohit P. Nandgaonkar, Branislav Curanovic, Jeremiah Hebding, Karl
D. Hirschman, Syed. S. Islam, Sean L. Rommel and Santosh K. Kurinec, Rochester
Institute of Technology, USA, Philip E. Thompson, Naval Research Laboratory, USA,
and Paul R. Berger and Niu Jin, The Ohio State University*

WP3: Novel Dielectrics I - 1:30pm - 3:30pm

Chairpersons: Susanne Stemmer and Takeo Hattori

Meeting Room: Kaleidoscope

1:30pm - 2:00pm **WP3-01 Invited**
Interface Composition and Band Alignment Issues in high-K Gate Stacks
*S. Sayan, L. Goncharova, D. Starodub, R.A. Bartynski, X. Zhao, D. Vanderbilt, T.
Gustafsson, and E. Garfunkel, Rutgers University*

2:00pm - 2:30pm **WP3-02 Invited**
Electronic Structure of High-k Gate Dielectrics- Applications to Tunneling
G. Lucovsky, NC State University

2:30pm - 2:50pm **WP3-03**
Conduction Mechanism in High-k ZrO₂ Gate Dielectric Films on strained-Ge Layers
*S. Bhattacharya, B.M. Armstrong, and H.S. Gamble, The Queen's University of Belfast,
United Kingdom, G.K. Dalapati, S. Das, S. Chakraborty, and C.K. Maiti, Indian
Institute of Technology, India, and J. McCarthy, T. Perova, and A. Moore, University of
Dublin, Trinity College, Ireland*

2:50pm - 3:10pm **WP3-04**
Physical Characterization of HfO₂ Deposited on Ge Substrates by MOCVD
*S. Van Elshocht, B. Brijs, M. Caymax, T. Conard, S. De Gendt, S. Kubicek, M. Meuris,
B. Onsia, O. Richard, I. Teerlinck, J. Van Steenbergen, C. Zhao and M. Heyns, IMEC*

3:10pm - 3:30pm **WP3-05**
Characterization of Tunnel Oxides for Non-volatile Memory (NVM) Applications
Jagdish Prasad, Jan Ackaert and Mike Thomason, AMI Semiconductor, Inc.

3:30pm - 3:45pm **Coffee Break - Mirage Foyer**

WP4: Photonics and Optoelectronics I - 3:45pm - 5:45pm

Chairpersons: Jung Han and Chris Bohler

Meeting Room: Mirage I

- 3:45pm - 4:15pm **WP4-01 *Invited***
Telecom-wavelength Electroluminescence from Processible Quantum Dot Nanocrystals
Ted H. Sargent, University of Toronto
- 4:15pm - 4:45pm **WP4-02 *Invited***
Hybrid Inorganic/Organic Luminescent Devices
A.J. Steckl and S. Allen, University of Cincinnati, USA, and J. Heikenfeld, Extreme Photonix LLC
- 4:45pm - 5:05pm **WP4-03**
Microstructural Examination of the Influence of Si Substrate Orientation on the Morphology of CdTe/ZnTe films
Dr. Wendy Sarney, Dr. Gregory Brill, and Dr. Nibir Dhar, US Army Research
- 5:05pm - 5:25pm **WP4-04 *Student***
Preliminary Study of As-for-Sb Exchange for Device Applications
Tomas Sarmiento and Dr. Gary May, Georgia Institute of Technology
- 5:25pm - 5:45pm **WP4-05**
Design of Photonic Crystals Fabricated from DNA Lattices
P. Sauer and H. -L. Cui, Stevens Institute of Technology, USA, and N. Seeman, New York University

WP5: Strained Si/SiGe FETs - 3:45pm - 5:45pm

Chairpersons: JDouglas Paul and Jeff Johnson

Meeting Room: Mirage II

- 3:45pm - 4:15pm **WP5-01 *Invited***
Strained Si/SiGe Technology: Status and Opportunity
Wilfried Haensch, SRDC
- 4:15pm - 4:35pm **WP5-02**
N-MOSFET performance in single and dual channel strained Si/SiGe CMOS
S. H. Olsen, A. G. O'Neill, S. Chattopadhyay, L. S. Driscoll, and K. S. K. Kwa, University of Newcastle, United Kingdom, D. J. Paul, University of Cambridge, United Kingdom, and J. Zhang, Imperial College of Science, Technology, and Medicine

- 4:35pm - 4:55pm **WP5-03**
The Relative performance enhancement of strained-Si and buried channel p-MOS as a function of lithographic and effective gate lengths
M.P. Temple and D.J. Paul, University of Cambridge, United Kingdom, Y.T. Tang, A.M. Waite, and A.G.R. Evans, Southampton University, United Kingdom, A.G.R. O'Neill, Newcastle University, United Kingdom, J. Zhang, Imperial College of Science, United Kingdom, and T. Grasby and E.H.C. Parker, University of Warwick
- 4:55pm - 5:15pm **WP5-04**
Strained Silicon FETs on Thin SiGe Virtual Substrates Produced by He Implantation: Reduced Self-heating on DC and RF Performance
T. Hackbarth, H. -J. Herzog, K. -H. Hieber, and U. König, DaimlerChrysler AG, Germany, S. Mantl, B. Holländer, S. Link, Institute für Schichten und Grenzflächen and eni, Germany, and H. von Känel, Politecnico di Milano, Italy
- 5:15pm - 5:35pm **WP5-05**
32 GHz and 40 GHz bandwidth distributed amplifier MMICs based on N-channel SiGe MODFETs
P. Abele, I. Kallfass and H. Schumacher, University of Ulm, Germany, M. Zeuner, J. Müller, T. Hackbarth and U. König, DaimlerChrysler Research, Germany, and D. Chrastina and H. von Känel, INFN and L-NESS
- 5:35pm - 5:55pm **WP5-06 Student**
Device Design for a Raised Extrinsic Base SiGe Bipolar Technology
E. Haralson, G. Malm, and M. Östling, KTH-Royal Institute of Technology

WP6: Novel Dielectrics II - 3:45pm - 5:45pm

Chairpersons: J.Eric Garfunkel and T.P. Ma

Meeting Room: Kaleidoscope

- 3:45pm - 4:15pm **WP6-01 Invited**
Structure and Stability of Alternative Gate Dielectrics for Si CMOS
Susanne Stemmer, University of California
- 4:15pm - 4:35pm **WP6-02**
Electrical Characterization of Dielectrics (Oxide, Nitride, Oxy-nitride) for Use in MIM Capacitors for Mixed Signal Applications
Jagdish Prasad, Muhammed Anser and Mike Thomason, AMI Semiconductors, Inc.

- 4:35pm - 4:55pm **WP6-03**
Composition, Chemical Structure and Electronic Band Structure of Rare Earth Oxide/Si(100) Interfacial Transition Layer
T. Hattori, T. Yoshida, T. Shiraishi, K. Takahashi, and H. Nohira, Musashi Institute of Technology, Japan, S. Joumori, K. Nakajima, M. Suzuki, and K. Kimura, Kyoto University, Japan, and Kashiwagi, S. Ohmi, C. Ohshima, and H. Iwai, Tokyo Institute of Technology
- 4:55pm - 5:15pm **WP6-04**
Microscopic bonding and macroscopic strain relaxations at Si-SiO₂ interfaces
G. Lucovsky, NC State University
- 5:15pm - 5:35pm **WP6-05 Student**
The Effects of Nitrogen in HfO₂ for Improved MOSFET Performance
H.-J. Cho, C. Y. Kang, C. S. Kang, R. Choi, Y. H. Kim, M. S. Akbar, C. H. Choi, S. J. Rhee, and J. C. Lee, University of Texas at Austin
- 7:30pm - 10:00pm **Welcome Reception and Poster Session - Mirage Ballroom**

WP7: Poster Presentations - 7:30pm - 10:00pm

Meeting Room: Mirage Ballroom

WP7-01 - GaN Optoelectronics and LED Lighting

WP7-01-01

Luminescence of Pr and Tm Ions Implanted into AlN Thin Films

W. M. Jadwisienczak and H. J. Lozykowski, Ohio University

WP7-01-02 Student

Improved Luminance and Efficiency of ZnS:Mn and GaN:Eu TDEL Devices Using PZT Thick Dielectric films

C. Munasinghe and A.J. Steckl, University of Cincinnati, USA, J. Heikenfeld, Extreme Photonix, LLC, USA, R. Dorey and R. Whatmore, Cranfield University, United Kingdom, and J. Bender and J. Wager, Oregon State University

WP7-01-03 Student

Improved ESD Reliability by Using a Modulation Doped Al_{0.12}Ga_{0.88}N/GaN Superlattice in Nitride-based LED

T.C.Wen, S.J. Chang, Y.K. Su, W.C. Lai, L.W. Wu, C.H. Kuo and Y.P. Hsu, National Cheng Kung University, Taiwan, L.W. Wu, C.H. Kuo and Y.P. Hsu, South Epitaxy Corporation, Taiwan, and J.K. Sheu, Optical Science Center, National Central University

WP7-01-04

Deep Ultraviolet Emission in AlGa_N-based Quantum Wells on Bulk AlN Substrates

Qhalid Fareed, Rakesh Jain and Remis Gaska, Sensor Electronic Technology, Inc., USA, Gintautas Tamulaitis, Ibrahim Yilmaz, and Michael Shur, Rensselaer Polytechnic Institute, USA, and Edmundas Kuokstis and Asif Khan, University of South Carolina

WP7-01-05 Student

Nitride-based QD LEDs

S.J. Change, Y.K. Su, L.W. Ji, C.S. Chang, L.W. Wu, and W.C. Lai, National Cheng Kung University, Taiwan, T.H. Fang, Southern Taiwan University of Technology, Taiwan, and K.T. Lam, Toko University

WP7-01-06 Student

Dependence of Film Morphology on Growth Rate in ITO/TPD/Alq₃/Al Organic Luminescent Diodes

H. Mu, University of Cincinnati

WP7-02 - Photonics and Optoelectronics

WP7-02-01 Student

A Modified UTC-PD Having High Speed and Efficiency Characteristics Utilizing a Frequency Compensation

D.H. Jun, I.H. Kang, and J.I. Song, Kwangju Institute of Science and Technology

WP7-02-02

Analytical Model for the InP/InGaAs Uni-Travelling Carrier Photodiode

S. Srivastava and K. P. Roenker, University of Cincinnati

WP7-02-03 Student

Novel Technology of Er-doped Glassy Films Fabrication for Applications in

A.V. Kholodkov and K.M. Golant, A.M. Prokhorov General Physics Institute of the Russian Academy of Sciences

WP7-02-04 Student

Mextram Modeling of Si/SiGe Heterojunction Phototransistors

F. Yuan and C. W. Liu, National Taiwan University, Taiwan, Z. Pei and J. W. Shi, ERSO/ITRI, Taiwan, and S. T. Chang, Chung Yuan Christian University

WP7-02-05

Blue Electroluminescence from MOS Capacitors with Si-Implanted SiO₂

T. Matsuda, M. Kawabe, K. Nishihara, and H. Iwata, Toyama Prefectural University, Japan, S. Iwatsubo, Toyama Industrial Technology Center, Japan, and T. Ohzone, Okayama Prefectural University

WP7-03 - Wide Band Gap Semiconductors - GaN

WP7-03-01

Compositional Pulling Effect in High Al-content AlGa_N films Grown on (0001) Sapphire Substrates

Yu-Li Tsai, Cheng-Liang Wang, Po-Hung Lin, Wei-Tsai Liao and Jyh-Rong Gong, Feng Chia University

WP7-03-02

Effect on high Al-content AlGa_N/Ga_N short period strained-layer superlattices on the threading dislocations in Ga_N films

Cheng-Wei Huang, Su-Fen Tseng, Cheng-Liang Wang, Yu-Li Tsai, Wei-Tsai Liao and Jyh-Rong Gong, Feng Chia University, Taiwan, and Wen-Jen Lin, Long-Jang Hu and Ya-Tung Cherng, Chung Shan Institute of Science and Technology

WP7-03-03 Student

Nitride-based devices fabricated by wet etching

S.J. Chang, Y.K. Su, T.M. Kuan, C.H. Ko and S.C. Wei, National Cheng Kung University, Taiwan, W.H. Lan, National University of Kaohsiung, Taiwan, Y.T. Cheng, Institute for Microstructural Science, National Research Council, Taiwan, and S.C. Chen, Materials R&D Center, Chung Shan Institute for Science and Technology

WP7-03-04 Student

Nitride-based HFETs with carrier confinement layers

S.J. Chang, Y.K. Su, T.M. Kuan, C.H. Ko and S.C. Wei, National Cheng Kung University, Taiwan, W.H. Lan, National University of Kaohsiung, Taiwan, Y.T. Cherng, Chung Shan Institute of Science and Technology, Taiwan, and S.C. Chen, National Yunlin University of Science and Technology

WP7-03-05

Surface properties of Si-doped GaN films

T. Y. Lin and W. S. Su, National Taiwan Ocean University, Taiwan, and W. S. Su and Y. F. Chen, National Taiwan University

WP7-03-06

Ultra-high electric field transport in GaN-based heterostructures

S.A. Vitusevich, S.V. Danylyuk, N. Klein, M. V. Petrychuk, H. Lüth, Institut für Schichten und Grenzflächen, Germany, B. A. Danilchenko, S. E. Zelenskyi, A. P. Budnik, Institute of Physics, NASU, Ukraine, and A. Y. Avksentyer, V. N. Sokolove, V. A. Kochelap, A. E. Belyaev, Institute of Semiconductor Physics, NASU, Ukraine

WP7-03-07 Student

Growth Parameter Dependence of Gain Compression in AlGaIn/GaN HFETs

E. Faraclas, and A.F.M. Anwar, University of Connecticut, USA, and S. Islam, Rochester Institute of Technology

WP7-03-08 Student

Breakdown Voltage Enhancement of AlGaIn/GaN High Electron Mobility Transistors Using Annealing Technique

J. Lee, D. Liu, W. Lu, The Ohio State University

WP7-03-09 Student

Study of ZnO Thin Films Grown by PLD on (100) Si for Surface Acoustic Wave

A. N. Chryssis, S. Krishnamoorthy, and A. A. Iliadis, University of Maryland, USA, and U. Lee, Army Research Labs

WP7-04 - Wide Band Gap Semiconductors - SiC**WP7-04-01 Student**

Electron Mobility Model for Silicon Carbide Inversion Layers

Y. Zeng and M. White, Lehigh University

WP7-04-02

Numerical and Experimental Characterization of 4-H-SiC Schottky Diodes'

X. Zhang, N. Goldsman, J. B. Bernstein, J. M. McGarrity, and S. Powell, University of Maryland

WP7-04-03 Student

A New Edge Termination Technique for SiC Power Devices

S. Hu and K. Sheng, Rutgers University

WP7-04-04 Student

A New Lateral Insulated Gate Bipolar Transistor for Suppressing Parasitic Thyristor Latch-up by Employing a Folded Gate

J. -K. Oh, M. -W. Ha, and M. -K. Han, Seoul National University, Korea, and Y. -I. Choi, Ajou University

WP7-04-05

A Comparison of the AlN Annealing Cap for 4H SiC Annealed in a Nitrogen Versus an Argon Atmosphere

M. Derenge, K. Jones, K. Kirchner, and M. Ervin, US Army Research Lab, USA, and S. Hullavarad and R. Vispute, University of Maryland at College Park

WP7-04-06

Impurity and Defect Centers of n-type 4H-SiC Single Crystals Investigated by a Photoluminescence and a Piezoelectric Photo Thermal Spectroscopy

K. Sakai, A. Fukuyama, and T. Ikari, Miyazaki University, Japan, and S. Shigetomi, Kurume University

WP7-04-07

Silicon carbide ultraviolet photodetectors

V.I. Sankin, P.P. Shkrebiy and N.S. Savkina, Russian Academy of Sciences

WP7-04-08

Temperature Dependency of MOSFET Device Characteristics in 4H - and 6H-Silicon Carbide (SiC)

Md Hasanuzzaman, Syed K. Islam, Leon M. Tolbert and Mohammad T. Alam, University of Tennessee

WP7-04-09 Student

A Study of Interface Charges on the Operation of 4H Silicon Carbide Static (SiC) Static Induction Transistors (SITs)

J. Fuerherm, Y.A. Zeng, and M.H. White, Lehigh University

WP7-05 - Device Modeling**WP7-05-01**

SPICE Modeling of Double Diffused Vertical Power MOSFETs Exposed to Gamma

Y. Deng and M.S. Shur, Rensselaer Polytechnic Institute, USA, and T. Ytterdal and T.A. Fjeldly, Norwegian University of Science and Technology, Norway

WP7-05-02 Student

Modeling C-V Characteristics of Deep Sub- 0.1 Micron Mesoscale MOS Devices
I. Pesic, N.G. Gunther, and M. Rahman, Santa Clara University, USA and A.A. Mutlu,
Intel Corporation, USA

WP7-05-03 Student

A New Wideband Modeling Technique for Deep Sub-micron MOSFET's
Ming Hsiang Chiou and Klaus Y.J. Hsu, National Tsing Hua University

WP7-05-04

A Simple Method to Split Base-Collector Capacitance of BiPolar Junction Transistors
S. Lee, Hankuk University of Foreign Studies

WP7-05-05 Student

Electrical environment within the Silicon-on-Insulator MOSFET Structure
J. Mody, A. Venkatachalam, and P. Ghosh, Syracuse University

WP7-05-06 Student

The Impact of Scaling on Volume Inversion in Symmetric Double-Gate MOSFETs
*C. -H. Lin, J. He, X. Xi, H. Kam, A. M. Niknejad, C. Hu, University of California at
Berkeley, USA and M. Chan, Hong Kong University, Hong Kong*

WP7-05-07 Student

Dual-Gate (FinFET) and Tri-Gate MOSFETs: Simulation and Design
A. Breed and K.P. Roenker, University of Cincinnati

WP7-05-08 Student

The Power of Usint Automatic Device Optimization, Based on Iterative Device
Simulations, in Design of High Performance Devices
Kent Bertilsson and Hans-Erik Nilsson, Mid Sweden University

WP7-05-09

Impact of Metal Gate Work Function on Gate Leakage of MOSFETs
*Y.T. Hou and Tony Low, National University of Singapore, Singapore, M.F. Li, Institute
of Microelectronics, Singapore, and D.L. Kwong, University of Texas at Austin, USA*

WP7-05-10 Student

An Analytical Retention Model for SONOS Nonvolatile Memory Devices in the Excess
Electron State
Y. Wang and M.H. White, Lehigh University

WP7-05-11 Student

Effect of Insulated Shallow Extension for the Improved Short-Channel Effect of Sub-100 nm MOSFET

C.-H. Shih, Y.-M. Chen, and C. Lien, National Tsing Hua University

WP7-06 - SiGe Materials and Devices

WP7-06-01

Self-heating effects on strained Si/SiGe n-HFETs

Mauro Enciso, Frederic Aniel, and Laurent Giguere, Paris-Sud University, France, Thomas Hackbarth, Hans Herzog, and Ulf König, DaimlerChrysler Research Center, USA, and B. Höllander and Siegfried Mantl, Institut für Schichten und Grenzflächen, Germany

WP7-06-02

A Combined UHV-CVD and Rapid Thermal Diffusion Process for SiGe Esaki Diodes by Ultra Shallow Junction Formation

L. E. Wernersson, V. Zela, E. Lind and W. Seifert, University of Lund, Sweden, and S Kabeer, J Zhao, Y Yan, and A Seabaugh, University of Notre Dame, USA

WP7-06-03

Transit Times of SiGe:C HBTs using Non Selective Base Epitaxy

N. Zerounian, M. Rodriguez, F. Aniel, Universite Paris-Sud, France, and P. Chevalier, B. Martinet, and A. Chantre, STMicroelectronics

WP7-06-04 Student

BSIM3v3 Parameter Extraction and Design of VCO using SiGe Hetero-CMOS

S. Islam, Rochester Institute of Technology, USA, and A. F. M. Anwar, University of Connecticut

WP7-06-05 Student

Electrical Parameters in Highly Doped Strained n-Si 1-xGex Epilayers Grown on Si

D. Tsamakidis, Ch. Sargentis, and D. Lampakis, National Technical University of Athens, Greece, and A. Y. Kuznetsov, Royal Institute of Technology, Sweden

WP7-06-06 Student

Optimization of the Cutoff Frequency for Si 1-x Ge x HBTs

L. Ai, M. -C. Cheng, Clarkson University

WP7-06-07

Heating in Multi-Emitter SiGe HBTs

S.P. McAlister and W.R. McKinnon, Institute for Microstructural Sciences, National Research Council of Canada, Canada, and H. Lafontaine and S.J. Kovacic SiGe Semiconductor Inc.

WP7-06-08

3-D Simulation of Strained Si/SiGe Heterojunction FinFETs

Shu Tong Chang, Chung Yuan Christian University and Electronics Research and Service Organization

WP7-06-09

Analysis on the temperature dependent characteristics of SiGe HBTs

C.S. Liang, ITRI

WP7-07 - High Frequency Devices**WP7-07-01 Student**

Low-frequency Noise Characteristics of 0.13 μm In_{0.65}GaAs p-HEMT Under the Influence of Impact Ionization Induced Hole Current

T.W. Kim, I.H. Kang, J.H. Kim, and J.I. Song, Kwangju Institute of Science and Technology, Korea, and D.H. Kim and K.S. Seo, Seoul National University

WP7-07-02 Student*

Asymmetrically Recessed (ASR) 0.13 μm In_{0.65}GaAs HEMT's Using Double-Deck Shaped (DDS) Gate Technology

D. -H. Kim, S. -J. Yeon, and K. -S. Seo, Seoul National University, Korea, and J. -H. Lee, WAVICS Co.

WP7-07-03 Student

Noise in Metamorphic AlGaAsSb/InGaAs/AlGaAsSb HEMTs

R. Webster, Air Force Research Laboratory, USA, and A. F. M. Anwar, University of Connecticut

WP7-07-04

Slow-Wave Characteristics of Interconnects on Silicon Substrates

M. -H. Cho, G. -W Huang, K. -M. Chen, National Nano Device Laboratories, Taiwan, and H. -C Tseng, T. -L. Hsu, United Microelectronics Corporation

WP7-07-05

Temperature Effects on the Performance of 4-Port Transformers

S. -C. Wang, G. -W. Huang, K. -M. Chen, A. -S. Peng, M. -H. Cho, National Nano Device Laboratories, Taiwan, S. -D. Wu, National Chiao Tung University, Taiwan, and H. -C. Tseng, T. -L. Hsu, United Microelectronics Corporation

WP7-07-06

Simulation Study of InP/GaAsSb Double Heterojunction Bipolar Transistors

P.A. Balaraman and K.P. Roenker, University of Cincinnati

WP7-07-07

Low-frequency Noise Characteristics of AlSb/InAsSb HEMTs as a Function of Temperature and Illumination

W. Kruppa, J.D. Boos, B.R. Bennett, and B.P. Tinkham, Naval Research Laboratory

WP7-07-08

Ultra High Speed, Very Low Power InSb-based Quantum Well FETs for Logic

T. Ashley, A.R. Barnes, A.B. Dean, M.T. Emeny, M. Fearn, L. Haworth, D.G. Hayes, K.P. Hilton, R. Jefferies, T. Martin, K.J. Nash, T.J. Phillips, and W.H.A. Tang, QinetiQ, United Kingdom, and S. Datta, S. Hareland, and R. Chau, Intel Corporation, USA

WP7-07-09 Student

Crossover from Diffusive to Ballistic Transport as a Function of Frequency in a Two Dimensional Electron Gas

Sungmu Kang, Peter John Burke, University of California, Irvine, USA, and L.N. Pfeiffer and K.W. West, Bell Laboratories, Lucent Technologies

WP7-07-10

Plasma Wave Electronics Devices

Michael S. Shur, Rensselaer Polytechnic Institute, USA, and V. Ryzhii, University of Aizu, Japan

WP7-07-11

InAlAsSb/InGaSb Double Heterojunction Bipolar Transistor

R. Magno, J. B. Boos, P. M. Campbell, B. R. Bennett, E. R. Glaser, M. G. Ancona, B. P. Tinkham, D. Park, N. A. Papanicolaou, K. Ikossi, and B. V. Shanabrook, Naval Research Laboratory, USA and S. E. Mohney, Penn State University

WP7-08 - Nanoelectronics

WP7-08-01

AC Characterization of Top-Gated Carbon Nanotube Field Effect Transistors
D. V. Singh, K. A. Jenkins, J. Appenzeller, H. -S. P. Wong, IBM T. J. Watson Research Center

WP7-08-02 Student

Polyaniline/ Single walled Carbon Nanotube Composite Electronic Device
P.C. Ramamurthy, A.M. Malshe, W.R. Harrell, R.V. Gregory, K. McGuire, and A.M. Rao, Clemson University

WP7-08-03 Student*

Negative Differential Resistance in Silicon-Molecule Heterostructure
Titash Rakshit, Geng-Chiau Liang, Avik Ghosh, and Supriyo Datta, Purdue University

WP7-08-04

Numerical Modeling Study of Organic Pentacene-Based MOSFETs
D. Prentice and K.P. Roenker, University of Cincinnati

WP7-08-05

Modeling of Nonvolatile Floating Gate Quantum Dot Memory
E.S. Hasaneen, R. Bansal, and F. Jain, University of Connecticut, USA, E. Heller, Rsoft Inc., USA, and W. Huang, U.S. Military Academy

WP7-08-06 Student*

Study of ZnO Nanocluster Formation within Styrene-Acrylic Acid and Styrene-Methacrylic Acid Diblock Copolymers on Si and SiO₂ Surfaces
H. A. Ali, and A. A. Iliadis, University of Maryland, USA, and U. Lee, Army Research Labs

WP7-08-07 Student

Process and Device Characteristics of Pd Nanocrystals MOS Memory
Ch. Sargentis and D. Tsamakis, National Technical University of Athens, Greece, and K. Giannakopoulos and A. Travlos, National Center for Scientific Research

WP7-08-08

A Two-Dimensional Numerical Simulation of a Cylindrical Resonant Tunneling Structure Using a Parallelized Two-Dimensional Lattice Weyl-Wigner Transport Model
G. Recine, B. Rosen, H. Cui, Stevens Institute of Technology

WP7-08-09

Growth properties of self-assembled InAs quantum dots on a thin tensile-strained layer
J.S. Kim, J.H. Lee, S.U. Hong, W.S. Han, H.S. Kwack, and D.K. Oh, Electronics and Telecommunications Research Institute

WP7-08-10

Control of emission wavelength of InAs quantum dots grown by various growth
S.U. Hong, J.S. Kim, J.H. Lee, H.S. Kwack, W.S. Han, and D.K. Oh, Basic Research Laboratory

WP7-08-11

Temperature Variation of Nonradiative Electron Transitions in GaInNAs/GaAs SQW Investigated by a Piezoelectric Photothermal Spectroscopy
Tetsuo Ikari, Kenji Imani, Sin-ichi Fukushima and Masahiko Kondow, Miyazaki University, Japan, and Masahiko Kondow, Hitachi Ltd.

WP7-09 - Novel Device Concepts**WP7-09-01 Student**

A Novel SONOS Nonvolatile Flash Memory Devices Using Hot Hole Injection for Write and Tunneling to/from Gate for Erase
Y. Wang, Y. Zhao, B.M. Khan, C.L. Doherty, J.D. Krayner, and M.H. White, Lehigh University

WP7-09-02 Student

Modeling and Simulation of High-bandwidth Si-based MOS/SOI Photodetectors
Chee Wee Liu, National Taiwan University

WP7-09-03 Student

Analytical Threshold Voltage Model for Design and Evaluation of Tri-Gate MOSFETs
C. Zeng and D.W. Barlage, Electrical and Computer Engineering

WP7-09-04

The Simultaneous Logic and IDDQ Testing of CMOS Ics with Mixed-Mode Testing Facility for Sequential Circuits
Mamun Bin Ibe Reaz, Faisal Mohd. Yasin and Mohd. Shahiman Sulaiman, Multimedia University, Malaysia, Mohd. Alauddin Mohd. Ali, University Kebangsaan Malaysia

WP7-09-05

The Field Effect Diode
Farhad Taghibakhsh, Bahonar University

WP7-09-06 Student

A New Dual-Material Double-Gate (DMDG) SOI MOSFET for Nanoscale CMOS
M. Jagadesh Kumar and G.V. Reddy, Indian Institute of Technology

WP7-09-07

Nonparabolicity and Negative Differential conductance in Tunnelling from Metal into 2D Channel

Michael Feiginov, Technische Universität Darmstadt

WP7-09-08 Student

Suppression of DIBL of Deep Sub-micron FD SOI MOSFETs by Source/drain
Y. Nakajima, T. Hanajiri, T. Toyabe, T. Morikawa, and T. Sugano, Toyo University

WP7-10 - Novel Dielectrics

WP7-10-01 Student

Interfacial Oxide Thickness Determination and Interface Studies of HfO₂/SiO₂/Si
L. Xie, Y. Zhao, M.H. White, Lehigh University

WP7-10-02

Structure, Chemistry, and Electrical Performance of Silicon Oxide-Nitride-Oxide Stacks on Silicon

I. Levin, D. Yoder, and D. Fischer, NIST, USA, M. Kovler and Y. Roizin, Tower Semiconductor Ltd., Israel, and R. Leapman, National Institute of Health

WP7-10-03 Student

Characterizing Damage to Thin Oxides Induced during Programming Floating Trap Non-Volatile Semiconductor Memory Devices

Stephen J. Wrazien, Yu Wang, Bilal M. Khan and Marvin H. White, Lehigh University

WP7-10-04

Ge pMOSFETs with MOCVD HfO₂ gate dielectric

Nan Wu, Qingchun Zhang, Chunxiang Zhu, M.F. Li, and DSH Chan, National University of Singapore, Singapore, Albert Chin, National Chiao Tung University, Taiwan, D.L. Kwong, University of Texas at Austin, USA, L.K. Bera, N. Balasubramanian, A.Y. Du, and C.H. Tung, Institute of Microelectronics, Singapore, and Haitao Liu and Johnny K. O. Sin, Department of EEE, Hong Kong

WP7-10-05

Low Temperature MOSFET Technology with Schottky Barrier Source/drain, High-K Gate Dielectrics and Metal Gate Electrode

Shiyang Zhu, H.Y. Yu, S.J. Wang, J.H. Chen, Chen Shen, Chunxiang Zhu, S.J. Lee, M.F. Li, DSH Chan, and W.J. Yoo, National University of Singapore, Singapore, Anyan Du, C.H. Tung, and Jagar Singh, Institute of Microelectronics, Singapore, Albert Chin, National Chiao Tung University, Taiwan, and D.L. Kwong, University of Texas at Austin, USA

WP7-10-06

Germanium pNOSFETs with HfO₂ gate dielectric

Qingchun Zhang, Nan Wu, Chunxiang Zhu, M.F. Li, and DSH Chan, National University of Singapore, Singapore, Albert Chin, National Chiao Tung University, Taiwan, D.L. Kwong, University of Texas at Austin, USA, L.K. Bera, N. Balasubramanian, A.Y. Du, and C.H. Tung, Institute of Microelectronics, Singapore, and Haitao Liu and Johnny K.O. Sin, Department of EEE, Taiwan

WP7-11 - Advanced SOI Technology**WP7-11-01**

Breakdown of a simple scaling rule of SOI MOSFETs and its prolong by thinning BOX
T. Hanajiri, M. Niizato, K. Aoto, T. Toyabe, and T. Sugano, Toyo University

WP7-11-02 Student*

Beta Engineering and Circuit Styles for SEU Hardening SOI SRAM Cells
D.P. Ioannou and D.E. Ioannou, George Mason University

WP7-11-03

Application of the EKV model to the DTMOS SOI transistor

Jean-Pierre Colinge, Dept. of Electrical and Computer Eng., University of California, Davis, USA and Jong-Tae Park, Dept. of Electronics Engineering, University of Incheon, South Korea

WP7-11-04 Student

Circuit Performance of Double-Gate SOI CMOS

C.H. Lin, P. Su, X. Xi, J. He, A.M. Niknejad and C. Hu, University of California at Berkeley, USA, Y. Taur, University of California at San Diego, USA, M. Chan, Hong Kong University of Science and Technology, Hong Kong

WP7-11-05 Student

A Novel High Current Gain Lateral PNP Transistor on SOI for Complimentary Bipolar Technology

Dr. M. Jagadesh Kumar and Vinod Parihar, Indian Institute of Technology, Dehli

WP7-12 - Advanced Processing and Characterization

WP7-12-01 Student

An Approach to Low-Cost Fabrication of Lateral COOLMOS Structures

D. Shahjerdi, B. Hekmatshoar, M. Fathipour, University of Tehran, Iran, and A. Khakifirooz, Massachusetts Institute of Technology

WP7-12-02 Student*

Lateral Diffusion of Phosphorous Ions by Excimer Laser Annealing in the Poly-Si Film on Silicon Dioxide Film

M. C. Lee and M. K. Ham, Seoul National University

WP7-13 - MEMS and Bio Sensors

WP7-13-01 Student*

Characterization of a MEMS BioChip for Planar Patch-Clamp Recording

S. Pandey, R. Mehrotra, S. Wykosky and M. White, Lehigh University

WP7-13-02 Student*

Design and Fabrication of an InP-Based Moving Waveguide 1x2 Optical MEMS Switch

M.W. Pruessner, D. Kelly, R. Ghodssi, and M. Datta, University of Maryland, USA and H. Lim and R. Maboudian, University of California

WP7-13-03 Student

MEMS-Tunable Novel Monolithic Optical Filters in InP with Horizontal Bragg Mirrors

M. Datta, M.W. Pruessner, D.P. Kelly, and R. Ghodssi, University of Maryland

WP7-13-04 Student

Rapid Prototyping of 3D Microstructures by Direct Scanning Laser Writing

H. Yui, B. Li, and X. Zhang, Boston University

WP7-13-05 Student

Exploration of Magnetolectric Thin-film Sensors Using Superlattice Composition

Kao-Shuo Chang, University of Maryland, College Park

WP7-13-06 Student

Room Temperature Wafer Bonding By Elastomeric Polymer-Supported Cold Welding

W.Y. Zhang, G. S. Ferguson, and S. Tatic-Lucic, Lehigh University

WP7-14 - RF Effects in IC's

WP7-14-01 Student

A New Wideband Modeling Technique for Spiral Inductors
Ming Hsiang Chiou and Klaus Y. J. Hsu, National Tsing Hua University

WP7-14-02 Student

Frequency-Dependent Modeling of On-Chip Inductors on Lossy Substrates
Y. Bai, Z. Dilli, N. Goldsman and G. Metze, University of Maryland

WP7-14-03 Student

Design and fabrication of Schottky diode, on-chip RF power detector
W. Jeon, J. Rodgers, J. Melngailis, University of Maryland

WP7-14-04

Noise Mitigation in High-Speed Systems using Electromagnetic High-Impedance
O.M. Ramahi, Electrical and Computer Engineering Department, S. Shahparnia, Mechanical Engineering Department, B. Mohajer-Iravani, CALCE Electronic Products and Systems Center, and T. Kamgaing, Motorola

Thursday, December 11, 2003

Plenary Session - 8:00am - 10:30am

Chairperson: Ken Jones

- 8:15am - 9:00am **PL1 Invited**
Photonic Bandgap Based Designs for Nano-Photonic Integrated Circuits
E. Yablonovitch, University of California, Los Angeles
- 9:00am - 9:45am **PL2 Invited**
A New Spin on Electronics - Spintronics
Stuart A. Wolf, University of Virginia and DARPA
- 9:45am - 10:30 am **PL3 Invited**
Enhanced Functionality in GaN and SiC Devices By Using Novel Processing
S.J. Pearton, C.R. Abernathy, B.P. Gila, and F. Ren, University of Florida, USA, J.M. Zavada, US Army Research Office, USA, and S.N.G. Chu, Multiplex Inc.
- 10:30am - 10:45am **Coffee Break - Mirage Foyer**

TA1: Photonics and Optoelectronics II - 10:45am - 12:15pm

Chairpersons: Rajinder Khosla and Tom Murphy

Meeting Room: Mirage I

10:45am - 11:15am **TA1-01** *Invited*

Gallium-Arsenide Deep-Level Devices for 1.55 μ m Fiber-Optics

Janet L. Pan, Joseph E. Mcmanis, Thomas Osadchy, Louise Grober, and Jerry M. Woodall, Yale University

11:15am - 11:35am **TA1-02** *Student*

Drift Dominated InP/GaP Photodiodes

Y. Sun, A. Yulius, G. Li, J. Woodall, Yale University, USA, and G. Li, Southern Yangtze University, China

11:35am - 11:55am **TA1-03** *Student**

High-speed modulation of light emission using field aperture selecting transport in p-type Gallium Arsenide

T. Boone, H. Tsukamoto, and J. Woodall, Yale University

11:55am - 12:15pm **TA1-04** *Student*

Exploration of the Epitaxial Layer Affecting Behaviors of CMOS Photodiodes

W. -J. Liu, O. T. -C. Chen, National Chung Cheng University, Taiwan, and L. -K. Dai, P. -K. Weng, F. -W. Jih, Chung-Shan Institute of Science & Technology

TA2: High Frequency Devices I - 10:45am - 12:15pm

Chairpersons: Dwight Woolard and Elliot Brown

Meeting Room: Mirage II

10:45am - 11:15am **TA2-01** *Invited*

Carbon Nanotube Devices for GHz to THz Applications

Peter John Burke, University of California, Irvine

11:15am - 11:45am **TA2-02** *Invited*

Terahertz Sources and Detectors Based on Nonlinear Diodes

Thomas Crowe, University of Virginia

11:45am - 12:05pm **TA2-03**

Tunable CW-THz system with a log-periodic photoconductive emitter

R. Mendis, C. Sydlo, J. Sigmund, M. Feiginov, P. Meissner and H. L. Hartnagel, Darmstadt University of Technology

TA3: Novel Dielectrics III - 10:45am - 12:15pm

Chairpersons: Gerry Borsuk and Tom Murphy

Meeting Room: Kaleidoscope

10:45am - 11:15am **TA3-01** *Invited*

Characterization of charge trapping in SiO₂/HfO₂ dielectrics

R. Degraeve, L. Pantisano, and G. Groeseneken, IMEC, Belgium, and A. Kerber and E. Cartier, International Sematech, USA

11:15am - 11:35am **TA3-02**

Improved Crystalization Temperature and Interfacial Properties of HfO₂ Gate Dielectrics by adding Ta₂O₅ with TaN Metal Gate

Xiongfei Yu, Chunxiang Zhu, Qingchun Zhang, Nan Wu, Hang Hu, M.F. Li and DSH Chan, National University of Singapore, Singapore, Albert Chin, National Chiao Tung University, Taiwan, W.D. Wang, Institute of Material Research and Engineering, Singapore, and Dim-Lee Kwong, University of Texas, Austin, USA

11:35am - 11:55am **TA3-03**

Effect of PolySi/High-k Interface on Device Reliability

X. Wang, H. Bu, and T.P. Ma, Yale University, USA, and H.H. Tseng, and P. Tobin,

11:55am - 12:15pm **TA3-04** *Student*

Investigation of PVD HfO₂ MIM Capacitors for Si RF and Mixed Signal Ics Application

Hang Hu, Shi-Jin Ding, Chunxiang Zhu, YF Lu, M.F. Li, Byung Jin Cho, and Daniel SH Chan, National University of Singapore, Singapore, Subhash C Rustagi, and MB Yu, Institute of Microelectronics, Singapore, Albert Chin, National Chiao Tung University, Taiwan, and Dim-Lee Kwong, University of Texas at Austin, USA

12:15pm - 1:30pm **Lunch (on your own)**

TP1: Wide Band Gap Semiconductors - SiC I - 1:30pm - 3:30pm

Chairpersons: Ranbir Singh and Mikael Ostling

Meeting Room: Mirage I

1:30pm - 2:00pm **TP1-01** *Invited*

Heteroepitaxial growth of GaN, AlN, and AlGaN layers on SiC substrates by HVPE

Yu. Melnik, O. Kovalenkov, V. Soukhoveev, V. Ivantsov, Y. Shapovalova, A. Usikov, V. Dmitriev, Technologies and Devices International, Inc.

2:00pm - 2:30pm **TP1-02** *Invited*

Development of ohmic contact materials for wide gap p-type 4H-SiC

S. Tsukimoto, O. Nakatsuka, and Masanori Murakami, Kyoto University

- 2:30pm - 2:50pm **TP1-03**
 High Temperature Hall Effect Measurements of Semi-Insulating 4H-SiC Substrates
W.C. Mitchel and William D. Mitchell, Air Force Research Laboratory, Materials and Manufacturing Directorate, AFRL/MLPS, Wright-Patterson AFB, OH, USA, and M. E. Zvanut, Department of Physis, University of Alabama, Birmingham
- 2:50pm - 3:10pm **TP1-04 Student**
 Mobility of (1120) and (001) Orientated 4H-SiC Quantized Inversion Layers
G. Pennington, N. Goldsman, J. McGarrity, University of Maryland, USA, and A. Lelis, and C. Scozzie, U.S. Army Research Laboratory
- 3:10pm - 3:30pm **TP1-05**
 Wannier-Stark Localization in 6H-SiC JFET
V.I. Sankin, P.P. Shkrebiy, and A.A. Lebedev, Russian Academy of Sciences

TP2: High Frequency Devices II - 1:30pm - 3:30pm

Chairpersons: Jerry Woodall and Brad Boos

Meeting Room: Mirage II

- 1:30pm - 2:00pm **TP2-01 Invited**
 High-Speed 6.1 Angstrom InAs HBT Devices and Circuits
S. Thomas, K. Elliott, D. Chow, R. Rajavel, P. Deelman, D. McLaughlin, Y. Boegeman, and C. Fields, HRL Laboratories
- 2:00pm - 2:30pm **TP2-02 Invited**
 Advanced Substrate/buffer Layer Polishing Techniques to Optimize the Growth and Performance of 6.1Angstrom InAs HBTs
M.S. Goorsky, A.M. Noori, S.L. Hayashi, E.D. Meserole, and R.S. Sandhu, University of California, Los Angeles, USA, and M. Lange, A. Cavus, C. Monier, R. Hsing, D. Sawdai, M. Wojtowicz, T. R. Block, and A. Gutierrez-Aitken, Northrop Grumman Space Technology
- 2:30pm - 2:50pm **TP2-03 Student***
 InP Heterojunction Bipolar Transistor with a Selectively Implanted Collector Pedestal
Yingda Dong, Yun Wei, Zach Griffith, Miguel Urteaga, Mattias Dahlstrom, and Mark J.W. Rodwell, University of California at Santa Barbara
- 2:50pm - 3:10pm **TP2-04 Student**
 Low Leakage and High Speed InP/In_{0.53}Ga_{0.47}As/InP Metamorphic Double Heterojunction Bipolar Transistors on GaAs Substrates
Y.M. Kim, Z. Griffith, M.J.W. Rodwell and A.C. Gossard, University of California, Santa Barbara

* = Nominated for the Best Student Paper Award

3:10pm - 3:30pm **TP2-05**
6.2 Å In 0.2 Al 0.8 Sb/InAs 0.7 Sb 0.3 HEMTs for Low-Voltage High-Frequency Applications
N. A. Papanicolaou, B. P. Tinkham, J. B. Boos, B. R. Bennett, R. Bass, and D. Park, Naval Research Laboratory

TP3: Advanced SOI Technology I - 1:30pm - 3:30pm

Chairpersons: Marvin White and P. Fazan

Meeting Room: Kaleidoscope

1:30pm - 2:00pm **TP3-01 *Invited***
The Evolution of Silicon-on-Insulator MOSFETs
Jean-Pierre Colinge, Dept. of Electrical and Computer Eng., University of California, Davis, USA and Jong-Tae Park, Dept. of Electronics Engineering, University of Incheon, South Korea

2:00pm - 2:30pm **TP3-02 *Invited***
Scaling and Reliability of Deeply Scaled SOI CMOS
D.E. Ioannou, George Mason University

2:30pm - 3:00pm **TP3-03 *Invited***
Reliability Challenges of High Performance PD SOI CMOS with Ultra-thin Gate
E. Zhao, A. Salman, J. Zhang, N. Subba, J. Chan, A. Marathe, S. Beebe, and K. Taylor, AMD

3:00pm - 3:20pm **TP3-04**
Time-resolved Measurements of Self-heating in SOI and Strained-Si MOSFETs Using Off-state Leakage Current Luminescence
S. Polonsky and K.A. Jenkins, IBM T.J. Watson Research Center

3:20pm - 3:40pm **TP3-05 *Student****
Experimental Study on the Mobility Universality in Ultra Thin Body SOI pMOSFETs
Gen Tsutsui, Masumi Saitoh, Toshiharu Nagumo and Toshiro Hiramoto, University of Tokyo

3:30pm - 3:45pm ***Coffee Break - Mirage Foyer***

TP4: Wide Band Gap Semiconductors - SiC II - 3:45pm - 5:45pm

Chairpersons: Bill Mitchel and Mikael Ostling

Meeting Room: Mirage I

- 3:45pm - 4:15pm **TP4-01 *Invited***
Latest Advances in High Voltage, Drift Free, 4H-SiC PiN Diodes
Mrinal K. Das, Joseph J. Sumakeris, Sumithra Krishnaswami, Michael J. Paisley, Anant K. Agarwal and Adrian Powell, Cree, Inc.
- 4:15pm - 4:35pm **TP4-02 *Student***
An Analytical Model of SiC MESFETs Incorporating Trapping and Thermal Effects
S.S. Mukherjee, S.S. Islam, and R.J. Bowman, Rochester Institute of Technology
- 4:35pm - 4:55pm **TP4-03**
Reliability Concerns in Contemporary SiC Power Devices
R. Singh, A. Hefner, and T. McNutt, National Institute of Standards and Technology
- 4:55pm - 5:15pm **TP4-04 *Student***
Calculation of Lattice Heating in 4H-SiC RF Power Devices, Based on 2nd Electrical and 3rd Thermal Simulations
Kent Bertilsson and Hans-Erik Nilsson, Mid Sweden University, Sweden, and Chris Harris, Advanced Microwave Device Solutions AB
- 5:15pm - 5:35pm **TP4-05 *Student***
Recent results on InGaP Schottky diodes and GaP FETs
A. Chen and J.M. Woodall, Yale University

TP5: High Frequency Devices III - 3:45pm - 5:45pm

Chairpersons: Tom Crowe and Michael Shur

Meeting Room: Mirage II

- 3:45pm - 4:15pm **TP5-01 *Invited***
A Novel Interband-Resonant-Tunneling-Diode (I-RTD) Based High-Frequency
Dwight Woolard, U.S. Army Research Laboratory, USA, and Weidong Zhang and Boris Gelmont, University of Virginia
- 4:15pm - 4:45pm **TP5-02 *Invited***
Fundamentals of High-Field Electron Transport in Nitride Semiconductors for Terahertz Applications
K. W. Kim, and V. N. Sokolov, North Carolina State University, USA, V. A. Kochelap, and V. V. Korotyeyev, Institute of Semiconductor Physics, USA, and D. L. Woolard, U.S. Army Research Office

4:45pm - 5:15pm **TP5-03** *Invited*
A System-Level Analysis of Schottky Diodes for Incoherent THz Imaging Arrays
Elliot R. Brown, University of California, Los Angeles

5:15pm - 5:45pm **TP5-04** *Invited*
Terahertz Emission Using Quantum Dots and Microcavities
G. S. Solomon, Stanford University

TP6: Advanced SOI Technology II - 3:45pm - 5:45pm

Chairpersons: Dimitris Ioannou and Jean-Pierre Colinge

Meeting Room: Kaleidoscope

3:45pm - 4:15pm **TP6-01** *Invited*
A CMOS Compatible Low Power Ultra Dense Capacitor Less SOI Ram
P. Fazan, S. Okhomin, and M. Nagoga, Swiss Federal Institute of Technology

4:14pm - 4:45pm **TP6-02** *Invited*
Low-Power Device Design of Fully-Depleted SOI MOSFETs
T. Hiramoto, T. Nagumo, and T. Ohtou, University of Tokyo

4:45pm - 5:05pm **TP6-03** *Student*
DG-SOI Rationed Logic with Symmetric DG load- A Novel Approach for sub 50 nm
LV/LP Circuit Design
*S. Mitra, A. Salman, D.P. Ioannou, and D.E. Ioannou, George Mason University, USA,
and C. Tretz, San Jose Design Center*

5:05pm - 5:25pm **TP6-04** *Student*
Heat Flow in SOI Current Mirrors
F. Yu and M.C. Cheng, Department of Electrical and Computer Engineering

5:25pm - 5:45pm **TP6-05**
Simulation Study of RF Linearity in 50nm DG and SOI MOSFETs
S. Kaya and W. Ma, Ohio University

7:00pm - 10:00pm ***Symposium Awards Banquet - Mirage Ballroom***

Friday, December 12, 2003

FA1: Wide Band Gap Semiconductors - GaN I - 8:00am - 10:00am

Chairperson: Pankaj Shah and Gerry Borsuk

Meeting Room: Mirage I

- 8:00am - 8:30am **FA1-01 *Invited***
Insulated Gate III-N Devices and Ics
G. Simin, V. Adivarahan, H. Fatima, S. Saygi, A. Koudymov, X. He, W. Shuai, S. Rai, J. Yang, and M. Asif Khan, University of South Carolina, USA, A. Tarakji, J. Deng, and R. Gaska, Sensor Electronic Technology, Inc., USA, and M. S. Shur, Center for Broadband data Transfer, RPI
- 8:30am - 9:00am **FA1-02 *Invited***
Contacts to Group III Nitride Semiconductor Alloys
S. Mohnney, The Pennsylvania State University
- 9:00am - 9:20am **FA1-03**
Migration Enhanced Metal Organic Chemical Vapor Desposition of AlN/GaN/InN-based Heterostructures
Qhalid Fareed and Remis Gaska, Sensor Electronic Technology, Inc., USA and Michael Shur, Rensselaer Polytechnic Institute
- 9:20am - 9:40am **FA1-04 *Student****
Dependence of Schottky Barrier Height on Electronic and Chemical Properties of Ni/AlGa_N Contacts
S. Bradley and L. Brillson, The Ohio State University, USA, and J. Hwang and W. Schaff, Cornell University
- 9:40am - 10:00am **FA1-05 *Student***
Annealing Effects on the Interfacial Properties of GaN MOS Prepared by Photo-Enhanced Wet Oxidation
H.-M. Wu, J.-Y. Lin and L.-H. Peng, National Taiwan University, Taiwan, C.-M. Lee and J.-I. Chyi, National Central University, Taiwan, and E. Chen, Tekcore Co. Ltd.

* = Nominated for the Best Student Paper Award

FA2: Nanoelectronics I - 8:00am - 10:00am

Chairperson: Eric Snow and Antoine Kahn

Meeting Room: Mirage II

- 8:00am - 8:30am **FA2-01** *Invited*
Electronic Transport in Carbon Nanotube Field-effect Transistors
Joerg Appenzeller, T.J. Watson Research Center
- 8:30am - 8:50am **FA2-02** *Student*
Electron Mobility of a Semiconducting Carbon Nanotube
G. Pennington, A. Akturk, and N. Goldsman, University of Maryland
- 8:50am - 9:10am **FA2-03**
Carbon Nanotube Networks: Applications on Flexible Substrates
J. Novak, M. Lay, F. K. Perkins, and Eric Snow, U.S. Naval Research Labs
- 9:10am - 9:40am **FA2-04** *Invited*
The Analysis, Design, and Simulation of Molecular Electronic Devices Using Ab Initio Based Methods
J. Seminario, R. Araujo, L. Yan, Y. Ma, University of South Carolina
- 9:40am - 10:00am **FA2-05**
Molecular Electronic Devices formed by Direct Monolayer Attachment to Silicon
C. A. Richter, C.A. Hacker and L. J. Richter, National Institute of Standards and Technology

FA3: Material Characterization and Device Processing I - 8:00am - 10:00am

Chairperson: Len Brillson and Agis Iliadis

Meeting Room: Kaleidoscope

- 8:00am - 8:20am **FA3-01**
Suppression of the Reverse Short Channel Effect in Sub-Micron CMOS Devices
M. Thomason, J. Prasad, and J. De Greve, AMI Semiconductors
- 8:20am - 8:40am **FA3-02**
Chlorine-Hydrogen ECR Etching of InGaAsP/InP
R. Welty, C. Reinhardt, and I. Young Han, Lawrence Livermore National Laboratory, USA and B. Yoo and Y. Du, University of California at Davis
- 8:40am - 9:00am **FA3-03**
A Novel Polysilicon Gate Engineering by Laser Thermal Process for High Performance Sub-40nm CMOS Devices
T. Yamamoto, K. Okabe, T. Kubo, K. Goto, H. Morioka, M. Kase, and T. Sugil, Fujitsu Ltd., Japan and Y. Wang, T. Lin, and S. Talwar, Verdant Technologies, USA
- 9:00am - 9:20am **FA3-04** *Student**

** = Nominated for the Best Student Paper Award*

Maskless Fabrication of JFETs via Focused Ion Beams
Anthony J. De Marco and John Melngailis, University of Maryland

9:20am - 9:40am **FA3-05**
Optimizing Pattern Fill for Planarity and Parasitic Capacitance
Mark M. Nelson, Brett Williams, Chuck Belisle, Shayne Aytes, David Beasterfield, Jiwen Liu, Scott Donaldson, and Jagdish Prasad, AMI Semiconductors

9:40am - 10:00am **FA3-06 Student**
An Improved Shift-and-Ratio L_{eff} Extraction Method for MOS Transistors with Halo/Pocket Implants
E. Fathi, B. Afzal, and M. Fathipour, University of Tehran, Iran, and A. Khakifirooz, Massachusetts Institute of Technology, USA

10:00am - 10:15am **Coffee Break - Mirage Foyer**

FA4: Wide Band Gap Semiconductors - GaN II - 10:15am - 12:15pm

Chairperson: Asif Khan and Suzanne Mohney

Meeting Room: Mirage I

10:15am - 10:45am **FA4-01 Invited**
High Performance AlGaIn/GaN HEMTs with a Field Plated Gate Structure
Alessandro Chini, Dario Buttari, Robert Coffie, Likun Shen, Sten Heikman, Arpan Chakraborty, Stacia Keller, and Umesh K. Mishra, University of California, Santa Barbara

10:45am - 11:15am **FA4-02 Invited**
High Power GaN/AlGaIn/GaN HEMTS Operating at 2 to 25GHz Grown by Plasma-assisted Molecular Beam Epitaxy
Michael J. Manfra, Bell Laboratories, Lucent Technologies

11:15am - 11:35am **FA4-03**
Influence of Layer Structure and Surface Passivation on Performance of AlGaIn/GaN HEMTs on Si and SiC Substrates
J. Bernat, P. Javorka, M. Wolter, A. Fox, M. Marso, and P. Kordos, Institute of Thin Films and Interfaces

11:35am - 11:55am **FA4-04 Student**
Effect of Gate Recess Depth on Pulsed I-V Characteristics of AlGaIn/GaN HFETs
A. Conway, J. Li, and P. Asbeck, University of California, San Diego

11:55am - 12:15pm **FA4-05 Student**
Barrier Thickness and Mole Fraction Dependence of Power Performance of Undoped
Supply Layer- AlGaIn/GaN HFETs
*S. Islam, Rochester Institute of Technology, USA, and M. M. Rahman, A. F. M. Anwar,
University of Connecticut*

FA5: Nanoelectronics II - 10:15am - 12:15pm

Chairperson: Jorge Seminario and Joerg Appenzeller

Meeting Room: Mirage II

- 10:15am - 10:45am **FA5-01 Invited**
Fundamental Electronic Properties of Metal-Organic Contacts and Organic--Organic
Heterojunctions
Antoine Kahn, Princeton University
- 10:45am - 11:05am **FA5-02 Student**
Metal-Molecule-Semiconductor Heterostructures for Nanoelectronic Applications
S. Lodha and D.B. Janes, Purdue University
- 11:05am - 11:35am **FA5-03 Invited**
Silicon Nano-Devices and Single-Electron Devices
*Y. Takahashi, Y. Ono, A. Fujiwara, K. Nishiguchi, and H. Inokawa, NTT Basic Research
Laboratories*
- 11:35am - 11:55am **FA5-04**
Comparing Options for 'Ultimate' Scale SI MOSFETs
T. Walls, V. Sverdlov, and K. Likharev, Stony Brook University
- 11:55am - 12:15pm **FA5-05**
Nanoscale FinFETs for Low Power Applications
*W. Roesner, E. Landgraf, J. Kretz, L. Dreeskornfeld, H. Schafer, M. Stadele, T. Schulz,
F. Hofmann, R.J. Luyken, M. Specht, J. Hartwich, W. Pamler, and L Risch, Infineon
Technologies*

FA6: Material Characterization and Device Processing II - 10:15am - 12:15pm

Chairperson: Paul Pellegino and Ken Jones

Meeting Room: Kaleidoscope

- 10:15am - 10:35am **FA6-01**
Microwave Heating for Advanced Semiconductor Processing
John H. Booske, University of Wisconsin-Madison

- 10:35am - 10:55am **FA6-02**
 Specular X-ray Reflectivity and Small Angle X-Ray Scattering Study of Ultra-low Dielectric Constant Methylsilsequioxane Films
T.K. Goh and T.K.S. Wong, Nanyang Technological University, Singapore, and S. Wu, Institute of Microelectronics
- 10:55am - 11:15am **FA6-03 Student**
 Proton Irradiation Damages in CuInSe₂ Thin Film Solar Cell Materials by a Piezoelectric Photothermal Spectroscopy
Y. Akaki, N. Ohryoji, K. Yoshino and T. Ikari, Miyazaki University, Japan, S. Kawakita and M. Imaizumi, NASDA Tsukuba Space Center, Japan, S. Niki, K. Sakurai, and S. Ishizuka, National Institute of AIST, Japan, and T. Ohshima, Japan Atomic Energy Research Institute
- 11:15am - 11:35am **FA6-04 Student**
 Screening of Si-H bonds during plasma processing
Purushothaman Srinivasan, Bharath Vootukuru, and Durgamadhab Misra, New Jersey Institute of Technology
- 11:35am - 11:55am **FA6-05 Student**
 A Novel Self-aligned Gate-last MOSFET Process Comparing High-k Candidates
Chi On Chui, Hyoungsub Kim, James P. McVittie, Baylor B. Triplett, Paul C. McIntyre, and Krishna C. Saraswat, Stanford University
- 12:15pm - 1:15pm **Lunch (on your own)**

FP1: Device Modeling I - 1:15pm - 3:15pm

Chairperson: Neil Goldsman and Tibor Grasser

Meeting Room: Mirage I

- 1:15pm - 1:35pm **FP1-01 Student**
 Modeling of Direct Tunneling Current through Interfacial SiO₂ and high-K Gate Stacks
Y. Zhao and M.H. White, Lehigh University
- 1:35pm - 1:55pm **FP1-02 Student**
 An Analytical Model of Short-Channel Effect for Sub-100 nm MOSFET with Graded Junction and Halo Doped Channel
C.-H. Shih and C. Lien, National Tsing Hua University
- 1:55pm - 2:15pm **FP1-03 Student**
 Compact Models for Silicon Carbide Power Devices
T. McNutt and A. Mantooth, University of Arkansas, USA, and A. Hefner, D. Berning, and R. Singh, National Institute of Standards and Technology

- 2:15pm - 2:35pm **FP1-04**
 A Modeling of the Optical Properties of the Zinc Oxide/Zinc-Magnesium Oxide Double Barrier System
J.P. Xanthakis and G. Krokides, National Technical Univeristy of Athens, Greece, and A.A. Iliadis, University of Maryland
- 2:35pm - 2:55pm **FP1-05**
 Analytical Expression of Body Factor in Short Channel Bulk MOSFETs
Anil Kumar, Toshiharu Nagumo, Gen Tsutsui and Toshiro Hiramoto, University of Tokyo
- 2:55pm - 3:15pm **FP1-06**
 Impact of Asymmetric Metal Coverage on High Performance MOSFET Mismatch
J. Fukumoto and J. Burlison, LSI Logic Corporation, USA, and T. Das, J.E. Moon, and P.R. Mukund, Rochester Institute of Technology

FP2: Nanoelectronics III - 1:15pm - 3:25pm

Chairperson: Yasuo Takahashi and Hong Chi

Meeting Room: Mirage II

- 1:15pm - 1:45pm **FP2-01 *Invited***
 Prospects of III-V Quantum LSIs Based on Hexagonal BDD Approach
S. Kasai, T. Sato, and H. Hasegawa, Hokkaido University
- 1:45pm - 2:05pm **FP2-02**
 A Numerical Study of Vertical Transport in Arbitrary Quantum Well Structures
G. Recine, B. Rosen, H. Cui, Stevens Institute of Technology
- 2:05pm - 2:25pm **FP2-03**
 Single-Electron Turnstile Using Si-Wire Charge-Coupled Devices
A. Fujiwara, Y. Ono, and Y. Takahashi, NTT Corporation, Japan, and N. Zimmerman, NIST
- 2:25pm - 2:45pm **FP2-04 *Student***
 Resonant Tunneling Permeable Base Transistor for RF Applications
E. Lind, P. Lindström, and L.E. Wernersson, Lund University
- 2:45pm - 3:05pm **FP2-05 *Student****
 Excellent 2-bit Silicom-Oxide-Nitride-Oxide-Silicon (SONOS) Memory (TSM) with a 90-nm Merged-Triple Gate
Yong Kyu Lee, Jae Sung Sim, Suk Kang Sung, Tae Hoon Kim, Jong Duk Lee and Byung-Gook Park, Seoul National University, Korea, Sung Taeg Kang and Chilhee Chung, C&M System LSI, Donggun Park and Kinam Kim, ATD, R&D Center, Samsung Electronics

* = *Nominated for the Best Student Paper Award*

3:05pm - 3:25pm **FP2-06 Student**
MOS Ge/Si Quantum Dot Infrared Photodectors with Quantum Dot and Wetting Layer Responses
B.-C. Hsu, P.-S. Kuo, C.W. Liu, J.-H. Lu, and C.H. Kuan, National Taiwan University, Taiwan, S.T. Chang, Chung Yuan Christian University, Taiwan, and P.S. Chen, ERSO/ITRI

FP3: MEMS and Biosensors - 1:15pm - 3:15pm

Chairperson: Reza Ghodssi and Michael Gaitan

Meeting Room: Kaleidoscope

1:15pm - 1:45pm **FP3-01 Invited**
A Micromachined Preconcentrator for Enhanced Trace Detection of Illicit Materials
R. Andrew McGill, Stanley Stepnowski, Eric Houser, David Mott, Kevin Walsh, Michael Martin, and Viet Nguyen, Naval Research Laboratory, USA, Michael Martin and Mark Crain, University of Louisville, USA, Stuart Ross and Huey-Daw Wu, Nove Research, Inc., USA, and Jennifer Stepnowski and Ioana Voiculescu, George Washington

1:45pm - 2:15pm **FP3-02 Invited**
Multi-Functional Biochip for Biological Agent Detection
T. Vo-Dinh, G. Griffin, A. Wintenberg, Oak Ridge National Laboratory

2:15pm - 2:35pm **FP3-03 Student***
Suspended Waveguides for InP Optical MEMS
D. Kelly, M.W. Pruessner, M. Datta, and R. Ghodssi, University of Maryland

2:35pm - 2:55pm **FP3-04**
Photoacoustic Chemical Sensing on a MEMS-Based Platform
P. Pellegrino, R. Polcawich, U. S. Army Research Laboratory, USA and S. Firebaugh, U.S. Naval Academy

2:55pm - 3:15pm **FP3-05**
MEMS-Based Embedded Sensor Virtual Components for SoC
M. Afridi, A. Hefner, D. Berning, C. Ellenwood, and S. Semancik, National Institute of Standards and Technology, USA, and A. Varma and B. Jacobs, University of Maryland

3:15pm - 3:30pm **Coffee Break - Mirage Foyer**

FP4: Device Modeling II - 3:30pm - 5:30pm

Chairperson: Allen Hefner and Pankaj Shah

Meeting Room: Mirage I

- 3:30pm - 4:00pm **FP4-01** *Invited*
Closure Relations for Macroscopic Transport Models
Tibor Grasser, Technical University Vienna
- 4:00pm - 4:20pm **FP4-02**
Time-Domain Tools for the Investigation of Gain-Quenched Laser Logic
T. Bond and J. Kallman, Lawrence Livermore National Laboratory
- 4:20pm - 4:40pm **FP4-03** *Student*
Mixed-Mode Simulation of Non-Isothermal Quantum Device Operation and Full-Chip
A. Akturk, L. Parker, N. Goldsman and G. Metze, University of Maryland
- 4:40pm - 5:00pm **FP4-04**
Transient Response Modeling of InGaAs/InAlAs Quantum Device Photodetector with Barrier-Enhancement Regions
Dr. Gregory Tait and Dr. David Ameen, Virginia Commonwealth University
- 5:00pm - 5:20pm **FP4-05** *Student*
Simulation of Interface Roughness in DG-MOSFETs using Non-Equilibrium Green's
J. Fonseca and S. Kaya, Ohio University

FP5: Novel Device Concepts - 3:30pm - 5:30pm

Chairperson: Gerry Borsuk and Tom Murphy

Meeting Room: Mirage II

- 3:30pm - 3:50pm **FP5-01**
A Concept of Semiconductor Optical Routing Device Utilizing Minority Carrier Drift
Hironori Tsukamoto, Thomas D. Boone, and Jerry M. Woodall, Yale University
- 3:50pm - 4:10pm **FP5-02**
A Low-cost Horizontal Current Bipolar Transistor (HCBT) Technology for the BiCMOS Integration with FinFETs
T. Suligoj, P. Biljanovic, University of Zagreb, Croatia, H. Liu, J. Sin, K. Tsui, K. Chen, Hong Kong University of Science and Technology, Hong Kong, and K. Wang, University of California, USA

- 4:10pm - 4:30pm **FP5-03**
 Si doped p- and n-type $\text{Al}_x\text{Ga}_{1-x}\text{As}$ Epilayers for High Density Lateral-junction LED Arrays on (311)A Patterned Substrate
S. Saravanan, N.Dharmarasu, P. O. Vaccaro, J. M. Zanardi Ocampo, K. Kubota and N.Saito, ATR, Adaptive Communications Research Laboratories
- 4:30pm - 4:50pm **FP5-04 Student**
 Silicon MOSFET-based Field Induced Band-to-Band Tunneling Effect Transistor-
Kyung Rok Kim, Gwang-hyun Baek, Ki-Whan Song, Hyun Ho Kim, Jung-Im Huh, Jong Duk Lee and Byung-Gook Park, Seoul National University
- 4:50pm - 5:10pm **FP5-05 Student**
 Improved Quantization of 2DEG of p-HEMT
S. Gudimetta, S. Mil'shtein, University of Massachusetts

FP6: RF Effects in IC's -3:30pm - 5:30pm

Chairperson: Victor Granastein and Agis Iliadis

Meeting Room: Kaleidoscope

- 3:30pm - 4:00pm **FP6-01 Invited**
 Negative-Refractive-Index Metamaterials Using Loaded Transmission Lines and Enabling RF Devices
G. V. Eleftheriades, University of Toronto
- 4:00pm - 4:20pm **FP6-02 Student***
 Effects of Microwave Interference on the Operational Parameters of MOSFET
K. Kim, A. Iiadis and V. Granatstein, University of Maryland
- 4:20pm - 4:40pm **FP6-03 Student**
 Modeling RF Effects in Integrated Circuits with a New 3D Alternating-Direction-Implicit Maxwell Equation Solver
X. Shao, Goddard Space Flight Center, USA, and N. Goldsman, O. Ramahi, and P. Guzdar, University of Maryland
- 4:40pm - 5:00pm **FP6-04 Student**
 Measured RF Induced Non-linear Effects in Digital Electronics
T. M. Firestone, J. C. Rodgers, and V. L. Granatstein, University of Maryland
- 5:00pm - 5:20pm **FP6-05**
 An Impedance Transformer with Silicon RF MEMS Switches
Jeyasingh Nithianandam, Morgan State University

* = *Nominated for the Best Student Paper Award*