58TH DEVICE RESEARCH CONFERENCE

PRELIMINARY ADVANCE PROGRAM

Monday AM, June 19, 2000

DRC Plenary Session (Sturm Auditorium)

9:30 AM - 12:05 PM

Session Chair: Mark Rodder

Session Organizer: Mark Rodwell

Plenary Speakers:

9:30 AM, I.1 Invited
Silicon MOSFETs (Conventional and Non-Traditional) at the Scaling Limit: *James D. Plummer*[1]; [1]Stanford University, Department of Electrical Engineering

10:10 AM Break

10:35 AM, I.2 Invited
Silicon Micromachines for Science and Technology: *David Bishop*[1]; [1]Bell Laboratories/Lucent Technologies, Murray Hill, NJ 07974 USA

11:15 AM, I.3 Invited
The Future of Organic Semiconductor Devices: *Ananth Dodabalapur*[1]; [1]Bell Laboratories, Lucent Technologies Murray Hill, NJ 07974 USA

Monday PM, June 19th, 2000

Session II.A. *(DUC Ballroom A/B)* Silicon-Based FETs

Session Organizer: Edward Nowak, IBM

2:00 PM, II.A.-1, Invited
Device Characteristics of Crystalline Epitaxial Oxides on Silicon: *V. Kaushik*[1]*;* K. Eisenbeiser[1]; B-Y. Nguyen[1]; J. Finder[1]; Z. Yu[1]; J. Ramadani[1]; R. Droopad[1]; J. Curless[1]; C. Overgaard[1]; L. Prabhu[1]; J. Conner[1]; Motorola Digital/DNA Laboratories, Mats. & Struct. Lab., 3501 Ed Bluestein Blvd., MD K20, Austin, TX 78721 USA

2:30 PM, II.A.-2
SiGe and Si PMOSFET's Characteristics with ZrO2 Gate Dielectric: *T. Ngai*[1]; W. J. Qi[1]; X. Chen[1]; R. Sharma[1]; J. L. Fretwell[1]; J. C. Lee[1]; S. K. Banerjee[1]; [1]The University of Texas at Austin, Mail Code R9950, Microelect. Res. Ctr., R9950, Austin, TX 78758 USA

2:50 PM, II.A.-3
30nm Ultra-Thin Body SOI MOSFET with Selectively Deposited Ge Raised S/D: *Yang-Kyu Choi*[1]; Chenming Hu[1]; [1]University of California-Berkeley, 211-41 Cory Hall #1772, Berkeley, CA 94720-1772 USA

3:10 PM, II.A.-4
Vertical P-MOSFETS with Heterojunction Between Source/Drain and Channel: *Xiangdong Chen*[1]; Qiqing Ouyand[1]; Kou-Chen Liu[1]; Zhonghai Shi[1]; Al Tasch[1]; Sanjay Banerjee[1]; Xiangdong Chen[1]; [1]University of Texas at Austin, Microelect. Res. Ctr., 10100 Burnet Rd., Bldg. 160, Rm. 204F, Austin, TX 78758 USA

3:30 PM Break

3:50 PM, II.A.-5
Bandgap Engineering in Deep Submicron Vertical pMOSFETs: *Q. Quyang*[1]; X. D. Chen[1]; S. Mudanai[1]; D. L. Kencke[1]; A. F. Tasch[1]; S. K. Banerjee[1]; [1]The University of Texas at Austin, R9950, Microelect. Res. Ctr., 2.608B, Austin, TX USA

4:10 PM, II.A.-6
High Room Temperature Hole Mobility in Ge0.7Si0.3/Ge/Ge0.7Si0.3 Modulation Doped Heterostructures in the Absence of Parallel Conduction: *S. Madhavi*[1]; V. Venkataraman[1]; Y. H. Xie[2]; [1]Indian Institute of Science, Dept. of Phys., Bangalore-560 012 India; [2]UCLA

4:30 PM, II.A.-7
Low-Noise SiGe pMODFETs on Sapphire with 116 GHz,fmax: *S. J. Koester*[1]; R. Hammond[1]; J. O. Chu[1]; P. M. Mooney[1]; J. A. Ott[2]; C. S. Webster[2]; I. Lagnado[3]; P. R. de la Houssaye[3]; [1]IBM Corporation, Thomas J. Watson Research Center, P.O. Box 218, Yorktown Heights, NY 10598 USA; [2]IBM Microelectronics; [3]Space and Naval Warfare Systems Center, CA

Monday PM, June 19, 2000

Session II.B. *(DUC Ballroom C/D)*
GaN-FETs

Session Organizer: Ilesanmi Adesida, University of Illinois

2:00 PM, II.B.-1 Invited
AlGaN/GaN HEMTs and HBTs for Microwave Power: *Umesh K. Mishra*[1]; R. Vetury[1]; L. M. McCarthy[1]; Y. Smorchkova[1]; S. Keller[1]; H. Xing[1]; N. Zhang[1]; J. S. Speck[1]; R. York[1]; S. Denbaars[1]; [1]University of California, Elect. & Comp. Eng. and Mats., Depts., Santa Barbara, CA 93106 USA

2:30 PM, II.B.-2
High Power Demonstration at 10 GHz with GaN/A1GaN HEMT Hybrid Amplifiers: *S. T. Sheppard*[1]; W. L. Pribble[1]; D. T. Emerson[1]; Z. Ring[1]; R. P. Smith[1]; S. T. Allen[1]; J. W. Palmour[1]; [1]Cree, Inc., 4600 Silicon Dr., Durham, NC 27703 USA

2:50 PM, II.B.-3
Wideband A1/GaN/GaN HEMTs on SiC for Low Noise Applications: *Wu Lu*[1]; J. W. Yang[1]; M. Asif Khan[1]; I. Adesida[1]; [1]University of Illinois at Urbana-Champaign, Microelect. Lab. & Dept. of Elect. & Comp. Eng., Urbana, IL 61801 USA

3:10 PM, II.B.-4
Recessed-Gate GaN NESFET using ICP-RIE for High Temperature Microwave Applications: *C. Lee*[1]; W. Lu[1]; E. Piner[1]; I. Adesida[1]; [1]University of Illinois, Dept. of Elect. and Comp. Eng. and Microelect. Lab., 208 N. Wright St., Urbana-Champaign, IL 61801 USA

3:30 PM Break

3:50 PM, II.B.-5
GaN-based MESFETs and DC-MOSFETs: *R. Gaska*[1]; M. A. Khan[2]; X. Hu[2]; L. Simin[2]; J. Yang[2]; J. Deng[3]; S. Rumyantsev[3]; M. S. Shur[3]; [1]Sensor Electronic Technology, Inc., 21 Cavalier Way, Latham, NY 12110 USA; [2]University of South Carolina, SC USA; [3]RPI

Monday PM, June 19, 2000, 5:30 PM - 8:00 PM

Session III. *(DUC Gallery)* Poster Session

III.-1
New Device Models of Quantum Well Infrared Photodetectors: Janet L. Pan[1]; [1]Yale University, Becton Center, Rm. 505, 15 Prospect St., New Haven, CT 06520-8284 USA

III.-2
SiGe Low Loss Waveguides for 1.3 um Grown by Selective Epitaxy: A. Vonsovici[1]; L. Vescan[1]; S. P. Pogossian[1]; [1]University of Surrey, Guildford GU2 XH UK

III.-3
Ferromagnetic Fe/Ag-GaAs Waveguide Structures for Wideband Microwave Integrated Notch Filter Devices: Wei Wu[1]; C. S. Tsai[1]; C. C. Lee[1]; H. J. Yoo[1]; H. Hopster[1]; D. L. Mills[1]; [1]University of California, Dept. of Elect. and Comp. Eng. and Instit. of Surf. and Interf. Sci., Irvine, CA 92697 USA

III.-4
Memory Devices Utilizing Resonant Tunneling in Nanocrystalline Silicon Superlattices: L. Tsybeskov[1]; L. Montes[1]; A. Aron[1]; R. Krishman[1]; P. Fauchet[1]; B. White[2]; [1]University of Rochester, Dept. of Electr. & Comp. Eng., Computer Studies Bldg. 511, 160 Trustee Rd., Rochester, NY 14627-0231 USA; [2]Motorola, SPS, Austin, TX USA

III.-5
Vacuum Microelectronic Electron Emitter by InP Double Barrier Diode Toward RF Application: Y. Miyamoto[1]; M. Kurita[1]; K. Furuya[1]; [1]Tokyo Institute of Technology, Dept. of Elect. & Electronic Eng., 2-12-1, O-okayama, Megura, Tokyo 152-8552 Japan

III.-6
SB-Heterostructure Millimeter-Wave Zero-Bias Diodes: J. N. Schulman[1]; D. H. Chow[1]; C. W. Pobanz[1]; H. L. Dunlap[1]; C. D. Haeussler[1]; [1]HRL Laboratories, LLC, 3011 Malibu Canyon Rd., Malibu, CA 90265 USA

III.-7
Five-Terminal Amorphous Silicon Thin-Film Transistor Structure: Sandrine Martin[1]; Y. Feillens[1]; J. Kanicki[1]; [1]University of Michigan, Dept. of Elect. Eng. and Comp. Sci., 216 Engineering Programs, Bldg. 2609 Draper, Ann Arbor, MI 48109-2101 USA

III.-8
Lifetime Control By Low Energy Electron Irradiation and Hydrogen Annealing: J. Joe[1]; J. Park[1]; H. J. Kim[1]; S. H. Lee[1]; Z. Y. Shen[1]; Y. Nishihara[1]; [1]Ajou University, Dept. of Elect. Eng., Suwon 442-749 Korea

III.-9
Modeling High K Gate Current from p-type Si Inversion Layers: Y. Y. Fan[1]; S. Mudanai[1]; W. Qi[1]; J. C. Lee[1]; A. F. Tasch[1]; L. F. Register[1]; S. K. Banerjee[1]; [1]The University of Texas at Austin; Microelect. Res. Ctr., 2.608A, R9950, Austin, TX 78758 USA

III.-10
Scaling Limit of Silicon Nitride Gate Dielectric for Future CMOS Technologies: Y. C. Yeo[1]; Q. Lu[1]; W. Lee[1]; T. King[1]; C. Hu[1]; [1]University of California, Dept. of Elect. Eng. and Comp. Sci., Berkeley, CA 94720 USA

III-11
60nm Planarized Ultra-thin Body Solid Phase Epitaxy MOSFETs: Peiqui Xuan[1]; J. Kedzierski[1]; V. Subranmanian[1]; J. Bokor[1]; T. King[1]; C. Hu[1]; [1]University of California, Dept. of Elect. Eng. and Comp. Scis., Berkeley, CA 94720 USA

III.-12
Design Optimization of Stacked Gate Oxides with Easy Evaluation of Gate Leakage in Deep Submicron MOSFET: Jinlong Zhang[1]; Jiann S. Yuan[1]; Yi Ma[1]; Anthony S. Oates[1]; [1]University of Central Florida, Scl. of Elect. Eng. and Comp. Sci., Orlando, FL 32816 USA

III.-13
A Novel Sub-10nm Transistor: Pranav Kalavade[1]; K. C. Saraswat[1]; [1]Stanford University, 725 Reseda Dr., 32 Sunnyvale, CA 94087 USA

III.-14
Reliability and Modeling of GaN-Based Light Emitting Diode: Hyunsoo Kim[1]; Ji-Myon Lee[1]; B. Huh[1]; Sang-Woo Kim[1]; Dong-Joon Kim[1]; Seong-Ju Park[1]; Hyunsang Hwang[1]; [1]Kwangju Institute of Science and Technology, Dept. of Mats. Sci. and Eng., #1, Oryong-dong, Puk-gu, Kwangju 500-712 Korea

III.-15
pH Sensors Based on Wide Bandgap Semiconductors: A. Denisenko[1]; A. Aleksov[1]; I. Daumiller[1]; E. Kohn[1]; [1]University of Ulm, Dept. of Elect. Devs. & Cir., Albert-Einstein-Allee 45, 89081 Ulm, Germany

III.-16
Very Short Channel Metal-Gate Schottky Source/Drain SOI-PMOSFETs and their Short Channel Effect: A. Itoh[1]; M. Saitoh[1]; M. Asada[1]; [1]Tokyo Institute of Technology, Fac. of Eng., Dept. of Elect. and Elect. Eng., 2-12-1 O-okayama, Meguro-ku, Tokyo 152 8552 Japan

III.-17
Electron Transport in a Single Silicon Quantum Dot Structure using A Vertical Silicon Probe: Katsuhiko Nishiguchi[1]; Shunri Oda[1]; [1]Tokyo Institute of Technology, Res. Ctr. for Quantum Effect Electr., O-okayama, Meguro-Ku, Tokyo 152-8552, Japan

III.-18
A Silicon MOSFET/Field Emitter Array Fabricated using CMP: C. Y. Hong[1]; A. I. Akinwande[1]; [1]Massachusetts Institute of Technology, Microsystems Technology Laboratories, 39-653, 60 Vassar St. Cambridge, MA 02139 USA

III.-19
0.13 um Gate-Length In0.52A10.48As/In0.53Ga0.47As Metamorphic HEMTs on GaAs Substrate: D. C. Dumka[1]; G. Cueva[1]; W. E. Hoke[2]; P. J. Lemonias[2]; I. Adesida[1]; [1]University of Illinois, Dept. of Elect. and Comp. Eng. and Microelec. Lab., 208 N. Wright St., Urbana-Champaign, IL 61801 USA; [2]Raytheon RF Components, MA USA

III.-20
HBT on LEO GaN: L. McCarthy[1]; Y. Smorchkova[1]; P. Fini[1]; H. Xing[1]; M. Rodwell[1]; J. Speck[1]; S. DenBaars[1]; U. Mishra[1]; [1]University of California-Santa Barbara, ECE Dept., Santa Barbara, CA 93106 USA

Tuesday AM, June 20, 2000

Session IV. *(DUC Ballroom)* Emerging Technologies

Session Organizer: Mark Rodwell
Session Co-Chairs: Tayo Akiwande, MIT; Jeff Welser, IBM

9:00 AM, IV.-1 Invited
Microelectronic Arrays and Electric Field Assisted Self-assembly of Component Structures for Micro/Nanofabrication Applications: *Michael J. Heller*[1]; [1]Nanogen, 10398 Pacific Center Court, San Diego, CA 92121 USA

9:30 AM, IV.-2 Invited
Organic Electronics and E-Paper: *Pierre Wiltzius*[1]; [1]Bell Laboratories/Lucent Technologies, 700 Mountain Ave., Murray Hill, NJ 07974 USA

10:00 AM, IV.-3 Invited
The First Solid State Qubit: *J. S. Tsai*[1]; Y. Nakamura[1]; Yu Pashkin[1]; [1]Fundamental Research Laboratory, 34 Miyukigaoka, Tsukuba 305-8501 Japan

10:30 AM Break

10:50 AM, IV.-4 Invited
Issues, Concepts, and Challenges in Spintronics: *Sankar Das Sarma*[1]; J. Fabian[1]; X. D. Hu[1]; I. Zutic[1]; [1]University of Maryland, Dept. of Phys., College Park, MD 20742 USA

11:20 AM, IV.-5 Invited
Nanomechanical Systems: Progress, Challenges, and Ultimate Limits: *Michael Roukes*[1]; [1]California Institute of Technology, Pasadena, CA USA

Tuesday PM, June 20, 2000

Session V.A. *(DUC Ballroom A/B)* Displays and MEMs

Session Organizers: Vivek Subramanian, Berkeley; Hagen Klauk, Penn State

2:00 PM, V.A.-1 Invited
Nanoblock ICs and Smart Cereal Boxes: *Roger Stewart*[1]; [1]Alien Technology Corporation, 18410 Butterfield Blvd., Suite 150, Morgan Hill, CA 95037 USA

2:30 PM, V.A.-2
A New Self-Aligned Top-Gate Polysilicon TFT Architecture for Low Temperature Processing: *Ronald T. Fulks*[1]; Jackson Ho[1]; [1]Xerox Palo Alto Research Center, 3333 Coyote Hill Rd., Palo Alto, CA 94304 USA

2:50 PM, V.A.-3
What Can We Learn From Organic Single Crystal Devices?: *J. H. Schon*[1]; Ch. Kloc[1]; B. Batlogg[1]; [1]Lucent Technologies, Rm. MH 1E-318, 600 Mountain Ave., Murray Hill, NJ 07974-0636 USA

3:10 PM, V.A.-4
An Organic Thin Film Transistor Backplane for Flexible Liquid Crystal Displays: *C. D. Sheraw*[1]; J. A. Nichols[1]; D. J. Gundlach[1]; J. R. Huang[1]; C. C. Kuo[1]; H. Klauk[1]; T. N. Jackson[1]; M. Kane[2]; J. Camp[2]; F. Cuomo[2]; B. Green[2]; [1]The Pennsylavania State University, Ctr. for Thin Film Devices and Elect. Mats. and Proc. Res. Lab., University Park, PA 16802 USA; [2]Sarnoff Corporation, Princeton, NJ 08543 USA

3:30 PM Break

3:50 PM, V.A.-5
Development of A Novel Micromachined Magnetostatic Membrane Actuator: *Melvin Khoo*[1]; Chang Liu[1]; [1]University of Illinois at Urbana-Champaign, Microelec Lab, Urbana, IL 61801 USA

4:10 PM, V.A.-6
Development of A Novel Micro Electromechanical Tunable Capacitor with a High Tuning Range: *Jun Zou*[1]; C. Liu[1]; [1]University of Illinois at Urbana-Champaign, Microelec. Lab., Urbana, IL 61801 USA

Tuesday PM, June 20, 2000

Session V.B. *(DUC Ballroom C/D)*
Optical Sources

Session Organizer: Kevin Lear, Colorado State

2:00 PM, V.B.-1
Cylindrical Microcavity Light Emitters Realized with Double Oxide Confinement or Single-Defect Photonic Bandgap Crystals: *W. D. Zhou*[1]; J. Sabarinathan[1]; B. Kochman[1]; E. Berg[1]; O. Qasaimeh[1]; T. Brock[1]; S. Pang[1]; P. Bhattacharya[1]; [1]University of Michigan, Dept. of Elect. Eng. and Comp. Sci., Ann Arbor, MI 48109 USA

2:20 PM, V.B.-2
Room Temperature Continuous-Wave Operation of GaInNAs Long Wavelength VCSELs: *M. C. Larson*[1]; C. W. Coldren[1,2]; S. G. Spruytte[2]; H. E. Petersen[1]; J. S. Harris[2]; [1]Lawrence Livermore National Laboratory, P.O. Box 808, L-222, Livermore, CA 94551 USA; [2]Stanford University, CA USA

2:40 PM, V.B.-3
High Temperature Operation of GaInAsN Laserdiodes in the 1.3um Regime: *M. Fischer*[1]; M. Reinhardt[1]; A. Forchel[1]; [1]University of Wurzburg, Technische Physik, Am Hubland, 97074 Wurzburg, Germany

3:00 PM, V.B.-4
Low Threshold 1.3 um GaAsSb Lasers on GaAs Substrates: *O. Blum*[1]; J. F. Klem[1]; [1]Sandia National Laboratories, MS 0603, Albuquerque, NM 87185 USA

3:20 PM Break

3:40 PM, V.B.-5
Quaternary AIInGaN Based Vertically Conducted Light Emitting Diodes on SiC: *M. Asif Khan*[1]; V. Adivarahan[1]; M. Shatalov[1]; A. Lunev[1]; J. W. Yang[1]; G. Simin[1]; R. Gaska[2]; M. Shur[2]; [1]University of South Carolina, Dept. of ECE, Columbia, SC 29208 USA; [2]Sensor Electronic Techlology, Inc., Latham, NY 12110 USA

Tuesday PM, June 20, 2000, 8:15 PM - 10:00 PM

Rump Session

R.-1
High-K, Low-K or No $K?:
Organizers: Jack Hergenrother, Lucent; Vivek Subramanian, UC Berkeley

R.-2
GaN vs. SiC: Is there an Argument Anymore?:
Organizer: Anant Agarwal, Cree, Inc., 4600 Silicon Dr., Durham, NC 27703 USA

R.-3
Long Wavelength Lasers on Short Wavelength Substrates:
Organizers: Olav Solgard, Stanford; Kevin Lear, Colorado State, CA USA

Tuesday PM, June 20, 2000, 9:00 PM - 11:00 PM

Session III. *(DUC Gallery)*
Poster Session - Viewing Only

III.-1
New Device Models of Quantum Well Infrared Photodetectors: Janet L. Pan[1]; [1]Yale University, Becton Center, Rm. 505, 15 Prospect St., New Haven, CT 06520-8284 USA

III.-2
SiGe Low Loss Waveguides for 1.3 um Grown by Selective Epitaxy: A. Vonsovici[1]; L. Vescan[1]; S. P. Pogossian[1]; [1]University of Surrey, Guildford GU2 XH UK

III.-3
Ferromagnetic Fe/Ag-GaAs Waveguide Structures for Wideband Microwave Integrated Notch Filter Devices: Wei Wu[1]; C. S. Tsai[1]; C. C. Lee[1]; H. J. Yoo[1]; H. Hopster[1]; D. L. Mills[1]; [1]University of California, Dept. of Elect. and Comp. Eng. and Instit. of Surf. and Interf. Sci., Irvine, CA 92697 USA

III.-4
Memory Devices Utilizing Resonant Tunneling in Nanocrystalline Silicon Superlattices: L. Tsybeskov[1]; L. Montes[1]; G. Gron[1]; R. Krishman[1]; P. Fauchet[1]; B. White[2]; [1]University of Rochester, Dept. of Electr. & Comp. Eng., Computer Studies Bldg. 511, 160 Trustee Rd., Rochester, NY 14627-0231 USA; [2]Motorola, SPS, Austin, TX USA

III.-5
Vacuum Microelectronic Electron Emitter by InP Double Barrier Diode Toward RF Application: Y. Miyamoto[1]; M. Kurita[1]; K.

Furuya[1]; [1]Tokyo Institute of Technology, Dept. of Elect. & Electronic Eng., 2-12-1, O-okayama, Megura, Tokyo 152-8552 Japan

III.-6

SB-Heterostructure Millimeter-Wave Zero-Bias Diodes: J. N. Schulman[1]; D. H. Chow[1]; C. W. Pobanz[1]; H. L. Dunlap[1]; C. D. Haeussler[1]; [1]HRL Laboratories, LLC, 3011 Malibu Canyon Rd., Malibu, CA 90265 USA

III.-7

Five-Terminal Amorphous Silicon Thin-Film Transistor Structure: Sandrine Martin[1]; Y. Feillens[1]; J. Kanicki[1]; [1]University of Michigan, Dept. of Elect. Eng. and Comp. Sci., 216 Engineering Programs, Bldg. 2609 Draper, Ann Arbor, MI 48109-2101 USA

III.-8

Lifetime Control By Low Energy Electron Irradiation and Hydrogen Annealing: J. Joe[1]; J. Park[1]; H. J. Kim[1]; S. H. Lee[1]; Z. Y. Shen[1]; Y. Nishihara[1]; [1]Ajou University, Dept. of Elect. Eng., Suwon 442-749 Korea

III.-9

Modeling High K Gate Current from p-type Si Inversion Layers: Y. Y. Fan[1]; S. Mudanai[1]; W. Qi[1]; J. C. Lee[1]; A. F. Tasch[1]; L. F. Register[1]; S. K. Banerjee[1]; [1]The University of Texas at Austin; Microelect. Res. Ctr., 2.608A, R9950, Austin, TX 78758 USA

III.-10

Scaling Limit of Silicon Nitride Gate Dielectric for Future CMOS Technologies: Y. C. Yeo[1]; Q. Lu[1]; W. Lee[1]; T. King[1]; C. Hu[1]; [1]University of California, Dept. of Elect. Eng. and Comp. Sci., Berkeley, CA 94720 USA

III.-11

60nm Planarized Ultra-thin Body Solid Phase Epitaxy MOSFETs: Peiqui Xuan[1]; J. Kedzierski[1]; V. Subranmanian[1]; J. Bokor[1]; T. King[1]; C. Hu[1]; [1]University of California, Dept. of Elect. Eng. and Comp. Sciences, Berkeley, CA 94720 USA

III.-12

Design Optimization of Stacked Gate Oxides with Easy Evaluation of Gate Leakage in Deep Submicron MOSFET: Jinlong Zhang[1]; Jiann S. Yuan[1]; Yi Ma[1]; Anthony S. Oates[1]; [1]University of Central Florida, Scl. of Elect. Eng. and Comp. Sci., Orlando, FL 32816 USA

III.-13

A Novel Sub-10nm Transistor: Pranav Kalavade[1]; K. C. Saraswat[1]; [1]Stanford University, 725 Reseda Dr., 32 Sunnyvale, CA 94087 USA

III.-14

Reliability and Modeling of GaN-Based Light Emitting Diode: Hyunsoo Kim[1]; Ji-Myon Lee[1]; B. Huh[1]; Sang-Woo Kim[1]; Dong-Joon Kim[1]; Seong-Ju Park[1]; Hyunsang Hwang[1]; [1]Kwangju Institute of Science and Technology, Dept. of Mats. Sci. and Eng., #1, Oryong-dong, Puk-gu, Kwangju 500-712 Korea

III.-15

pH Sensors Based on Wide Bandgap Semiconductors: A. Denisenko[1]; A. Aleksov[1]; I. Daumiller[1]; E. Kohn[1]; [1]University of Ulm,

Dept. of Elect. Devs. & Cir., Albert-Einstein-Allee 45, 89081 Ulm, Germany

III.-16
Very Short Channel Metal-Gate Schottky Source/Drain SOI-PMOSFETs and their Short Channel Effect: A. Itoh[1]; M. Saitoh[1]; M. Asada[1]; [1]Tokyo Institute of Technology, Fac. of Eng., Dept. of Elect. and Elect. Eng., 2-12-1 O-okayama, Meguro-ku, Tokyo 152 8552 Japan

III.-17
Electron Transport in a Single Silicon Quantum Dot Structure using A Vertical Silicon Probe: Katsuhiko Nishiguchi[1]; Shunri Oda[1]; [1]Tokyo Institute of Technology, Res. Ctr. for Quantum Effect Electr., O-okayama, Meguro-Ku, Tokyo 152-8552 Japan

III.-18
A Silicon MOSFET/Field Emitter Array Fabricated using CMP: C. Y. Hong[1]; A. I. Akinwande[1]; [1]Massachusetts Institute of Technology, Microsystems Technology Laboratories, 39-653, 60 Vassar St. Cambridge, MA 02139 USA

III.-19
0.13 um Gate-Length In0.52A10.48As/In0.53Ga0.47As Metamorphic HEMTs on GaAs Substrate: D. C. Dumka[1]; G. Cueva[1]; W. E. Hoke[2]; P. J. Lemonias[2]; I. Adesida[1]; [1]University of Illinois, Dept. of Elect. and Comp. Eng. and Microelec. Lab., 208 N. Wright St., Urbana-Champaign, IL 61801 USA; [2]Raytheon RF Components, MA USA

III.-20
HBT on LEO GaN: L. McCarthy[1]; Y. Smorchkova[1]; P. Fini[1]; H. Xing[1]; M. Rodwell[1]; J. Speck[1]; S. DenBaars[1]; U. Mishra[1]; [1]University of California-Santa Barbara, ECE Dept., Santa Barbara, CA 93106 USA

Wednesday AM, June 21, 2000

Joint Plenary Session with EMC *(Sturm Auditorium)*
8:30 AM - 10:00 AM

DRC/EMC PLENARY LECTURE/STUDENT AWARDS

Ceremony: 8:20 AM

Room: Sturm Auditorium

Session Chairman: M. R. Melloch, Purdue University, School of Electrical and Computer Engineering, West Lafayette, IN 47907 USA

Plenary Speaker: L. L. Kazmerski

Topic: Photovoltaics Research and Development:: A Tour Through the 21st Century: *L. L. Kazmerski*[1]; [1]National Renewable Energy Laboratory, 1617 Cole Blvd, MS 3221, Golden, CO 80401 USA

BREAK: 9:20 AM - 10:00 AM

Session VI.A. *(Sturm Auditorium)*
SiC Power Switching Devices

Session Organizer: Anant Agarwal, Cree, Inc., 4600 Silicon Dr., Durham, NC 27703 USA

10:00 AM, VI.A.-1
2.7 kV Epitaxial Lateral Power DMOSFETs in 4H-SiC: *J. Spitz*[1]; M. R. Melloch[1]; J. A. Cooper, Jr.[1]; G. Melnychuk[2]; S. E. Saddow[1]; [1]Purdue University, School of Elect. and Comp. Eng., West Lafayette, IN 47907-1285 USA; [2]Mississippi State University, MS USA

10:20 AM, VI.A.-2
Improved Implanted RESURF MOSFETSs in 4H-SiC: *Sujit Banerjee*[1]; K. Chatty[1]; T. P. Chow[1]; R. J. Gutmann[1]; [1]Rensselaer Polytechnic Institute, Center for Integrated Elect. and Elect. Manuf., CII-6015110 8th St., Troy, NY 12180-3590 USA

10:40 AM, VI.A.-3
An Implanted Emitter 4H-SiC Bipolar Transistor with High Current Gain: *Yi Tang*[1]; J. B. Fedison[1]; T. Chow[1]; [1]Rensselaer Polytechnic Institute, Center for Intergrated Electr. and Electr. Manuf., CII-6015, 110 8th St., Troy, NY 12180-3590 USA

11:00 AM, VI.A.-4
1800V, 3.8 Bipolar Junction Transistors in 4H-SiC: *Sei-Hyung Ryu*[1]; Anant K. Agarwal[1]; Ranbir Singh[1]; John W. Palmour[1]; [1]Cree, Inc. 4600 Silicon Dr., Durham, NC 27703 USA

11:20 AM Break

11:40 AM, VI.A.-5
Switching Characteristics of 3kV 4H-SiC GTO Thyristors: *Jeffrey B. Fedison*[1]; T. Chow[1]; A. Agarwal[2]; S. Ryu[2]; R. Singh[2]; O. Kordin[2]; J. Palmour[2]; [1]Rensselaer Polytechnic Institute, Ctr. for Integrated Electr. and Electr. Manuf., CII-6015, 110 8th St., Troy, NY 12180-3590 USA; [2]Cree, Inc.

Wednesday AM, June 21, 2000

Session VI.B. *(DUC Ballroom A/B)*
III-V FETs and HBTs

Session Organizer: Yasuyuki Miyamoto, Tokyo Institute of Technology

10:00 AM, VI.B.-1 Invited
Highly Efficient High Power InP HEMT Amplifiers for High Frequency Applications: *Y. C. Chen*[1]; R. Lai[1]; D. L. Ingram[1]; T. Block[1]; M. Wojtowicz[1]; P. H. Liu[1]; H. C. Yen[1]; A. Oki[1]; D. C. Streit[1]; K.

Yano[1]; [1]TRW Electronics & Technology Division, One Space Park, Redondo Beach, CA 90278 USA

10:30 AM, VI.B.-2
High Ft and Fmax InAIAs/InGaAs Transferred-Substrate HBTs: *Y. Betser*[1]; D. Mensa[1]; S. Jaganathan[1]; T. Mathew[1]; M. J.W. Rodwell[1]; [1]University of California-Santa Barbara, ECE Dept., Santa Barbara, CA 93106 USA

10:50 AM, VI.B.-3
MOCVD-Grown 175 GHz InP/GaAsxSb1-x/InP DHBTs with High Current Gains Using Strained and Heavily C-Doped Base Layers: *M. W. Dvorak*[1]; N. Matine[1]; S. P. Watkins[1]; C. R. Bolognesi[1]; [1]Simon Fraser University, Scl. of Eng. Sci., and Dept. of Phys., 8888 University Dr., Burnaby, BC, Canada V5A 1S6

11:10 AM, VI.B.-4
Design and Characterization of GaAs/Ga0.89In0.11N0.02As-0.98/GaAs NpN Double Heterojunction Bipolar Transistors with Low Turn On Voltage: *R. J. Welty*[1]; H. P. Xin[1]; K. Mochizuki[1]; C. W. Tu[1]; P. M. Asbeck[1]; [1]University of California at San Diego, LaJolla, CA 92093-0407 USA

11:30 AM Break

11:50 AMVI.B.-5
First Demonstration of the AlGaAs/InGaAsN/GaAs P-n-P Double Heterojunction Bipolar Transistor: *P. C. Chang*[1]; N. Y. Li[2]; J. R. Larouche[3]; C. Monier[4]; A. G. Baca[1]; H. Q. Hou[2]; E. Ren[3]; S. J. Pearton[4]; [1]Sandia National Laboratories, Advanced Semiconductor Technology, P.O. Box 5800, M.S. 0603, Albuquerque, NM USA; [2]EMCORE; [3]University of Florida, Chem. E.; [4]University of Florida, MSE

Wednesday PM, June 21, 2000

Session VII.A. *(Sturm Auditorium)* Quantum Devices

Session Organizer: Richard Kiehl, University of Minnesota

2:00 PM, VII.A.-1
Single Electron Memory Utilizing Nano-Crystalline Si over Short Channel Silicon-on-Insulator Transistors: *B. J. Hinds*[1]; A. Dutta[1]; B. F. Yun[1]; C. T. Yamanaka[1]; D. S. Hatanani[1]; S. Oda[1]; [1]Tokyo Institute of Technology, Res. Ctr. for Quantum Effect Elect, 2-12-1 O-okayama, Megura-ku, Tokyo 152-8552 Japan

2:20 PM, VII.A.-2
Multiple-Valued Memory Operation in SiN-Based Single-Electron Memory: *G. Sunamura*[1]; H. H. Kawaura[1]; I. T. Sakamoto[1]; J. T. Bab[1]; [1]NEC Fundamental Research Laboratories, 34 Miyukigaoka, Tsukuba-shi, Ibaraki 305-8501 Japan

2:40 PM, VII.A.-3
GaAs Single Electron Transistors and Logic Inverters Based on Schottky Wrap Gate Structures: *S. Kasai*[1]; H. Hasegawa[1]; [1]Hokkaido University, Res. Ctr. for Interface Quant. Electr. and Grad. Sch. of Electr. and Info. Eng., North 13, West 8, Sapporo 060-8628 Japan

3:00 PM, VII.A.-4
Experimental Studies of Clocked Quantum-dot Cellular Automata Devices: *Alexei Orlov*[1]; A. Togh[1]; I. Amlani[1]; R. Kummamuru[1]; R. Ramasubramaniam[1]; C. Lent[1]; G. Bernstein[1]; G. Snider[1]; [1]University of Notre Dame, Dept. of Elect. Eng., Notre Dame, IN 46556 USA

3:20 PM Break

3:40 PM, VII.A.-5
Development of Delta-B/I-Si/Delta-Sb and Delta-B/I-Si/Delta-Sb/I-Si/Delta-B Resonant Interband Tunnel Diodes for Integrated Circuit Application: *Sean L. Rommel*[1]; N. Jin[1]; T. E. Dillon[1]; S. J. diGiacomo[1]; J. Banyai[1]; B. M. Cord[1]; C. D'Imperio[1]; D. J. Hancock[1]; N. Kirpalani[1]; V. Emanuele[1]; P. R. Berger[1]; P. E. Thompson[2]; K. D. Hobart[2]; R. Lake[3]; [1]University of Delaware, Dept. of Elect. & Comp. Eng., 140 Evans Hall, Newark, DE 19716 USA; [2]NRL, Washington, DC USA; [3]Raytheon Systems, Dallas, TX USA

4:00 PM, VII.A.-6
Monolithic Integration of InA1As/InGaAs/InP HEMTs and InAs/A1Sb/GaSb Resonant Interband Tunneling Diodes (RITDs) for High Speed Integrated Circuits: *P. Fay*[1]; J. Lu[1]; Y. Xu[1]; G. H. Bernstein[1]; D. H. Chow[1]; J. N. Schulman[1]; H. L. Dunlap[1]; J. De Los Santos[1]; [1]University of Notre Dame, Dept. of Elect. Eng., Notre Dame, IN 46556 USA

Wednesday PM, June 21, 2000

Session VII.B. *(DUC Ballroom A/B)* Photodetectors and Phototransceivers

Session Organizer: Pallab Bhattacharya, University of Michigan

2:00 PM, VII.B.-1 Invited
Ultrafast Uni-Traveling-Carrier Photodiode: *Hiroshi Ito*[1]; Tadao Ishibashi[1]; [1]NTT Photonics Laboratories, 3-1, Morinosato Wakamiya, Atsugi-shi, Kanagawa 243-0198 Japan

2:30 PM, VII.B.-2
Ultraviolet Photon Counting with GaN Avalanche Photodiodes: *K. A. McIntosh*[1]; S. Verghese[1]; R. J. Molnar[1]; L. J. Mahoney[1]; K. M. Molvar[1]; M. K. Connors[1]; R. L. Aggarwal[1]; I. L. Melngailis[1]; [1]Massachusetts Institute of Technology; Lincoln Laboratory, 244 Wood St., Lexington, MA 02420-9108 USA

2:50 PM, VII.B.-3
Dark Current Reduction and Operational Wavelength Shift in Normal Incidence InAs/GaAs QDIPs through the Introduction of A1GaAs Layers in the Active Region of the Detector: *O. Baklenov*[1]; Z. H. Chen[1]; E. T. Kim[1]; I. Mukhametzhanov[1]; A. Madhukar[1]; F. Ma[2]; Z. Ye[2]; B. Yang[2]; J. Campbell[2]; [1]University of Southern California, Mats. Svc. Dept., 3651 Watt Way VHE 506, Los Angeles, CA 90089 USA; [2]University of Texas at Austin, Austin, TX USA

3:10 PM, VII.B.-4
P-I-N Photodiodes in Metamorphic InA1As/InGaAs/GaAs for Long Wavelength Applications: *J.-H. Jang*[1]; G. Cueva[1]; D. C. Dumka[1]; W. E. Hoke[2]; P. J. Lemonias[2]; I. Adesida[1]; [1]University of Illinois, Dept. of Elect. and Comp. Eng. and Microelec. Lab., 208 N. Wright St., Urbana-Champaign, IL 61801 USA; [2]Raytheon RF Products, MA USA

3:30 Break

3:50 PM, VII.B.-5
Monolithically Integrated Low-Power Phototransceiver Incorporating Microcavity LEDs and Multiquantum Well Phototransistors: *O. Qasaimeh*[1]; W. Zhou[1]; P. Bhattacharya[1]; D. Huffaker[2]; D. Deppe[2]; [1]University of Michigan, Dept. of Elect. Eng. and Comp. Sci., Ann Arbor, MI 48105-2122 USA; [2]University of Texas at Austin, Austin, TX USA