

# Future IEEE MTT-S International Microwave Symposia

**2004, Fort Worth, Texas**  
**June 6-11, 2004**

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**2007 Honolulu, Hawaii, June 2-8, 2007**

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**2008 Atlanta, Georgia, June 13-19, 2008**

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**Chairman:** Fred Schindler, RF Micro Devices, (978) 670-2230, mschindler@rfmd.com

**2010 Anaheim, California, June 2010**

**Chairman:** J.K. McKinney, Dura Sales Inc., (909) 612-1044, j.mckinney@ieee.org

# 2003 Microwave Symposium Technical Program Schedule

## Session TU1A Plenary Session

8:00 – 9:50 am

Ballroom

Tuesday, June 10, 2003

Chair: R. Snyder, RS Microwave  
Co-chair: K. Tomiyasu, Lockheed Martin

**TU1A-1**    **Keynote Address**  
**8:00 AM**    R. Andrews

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## Session TU1B

### Novel Modeling Techniques for Microwave CAD

10:10 – 11:50am

Room 201A

Tuesday, June 10, 2003

Chair: A.K. Sharma, Northrop Grumman  
Co-chair: M. Mogiardo, Elettronica e dell'Informazione

|                                  |                                                                                                                                                                                                    |           |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>TU1B-1</b><br><b>10:10 AM</b> | <b>A General SPICE Model for Arbitrary Linear Dispersive Multiport Components Described by Frequency-Domain Data</b><br>V. Rizzoli, A. Costanzo, F. Mastri, and A. Neri                            | <b>9</b>  |
| <b>TU1B-2</b><br><b>10:30 AM</b> | <b>Multidimensional Time-Domain Macromodels for Microwave Applications</b><br>P. Gunupudi, R. Khazaka, T. Smy, D. Celo, and M. Nakhla                                                              | <b>13</b> |
| <b>TU1B-3</b><br><b>10:50 AM</b> | <b>A New Wavelet-Based Technique For Fast Full-Wave Physical Simulations of Millimeter-Wave Transistors</b><br>Y.A. Hussein, S.M. El-Ghazaly, and S.M. Goodnick                                    | <b>17</b> |
| <b>TU1B-4</b><br><b>11:10 AM</b> | <b>A Fast Filter Optimization Scheme Based On Model Order Reduction</b><br>K. Krohne and R. Vahldieck                                                                                              | <b>21</b> |
| <b>TU1B-5</b><br><b>11:30 AM</b> | <b>Extraction of Coupling Parameters For Microwave Filters: Determination of a Stable Rational Model from Scattering Data</b><br>F. Seyfert, L. Baratchart, J-P. Marmorat, S. Bila, and J. Sombrin | <b>25</b> |

## Session TU2B

### Passive Components

**10:10 – 11:50am**

**Room 201C**

**Tuesday, June 10, 2003**

Chair: J. Taub, Consultant

Co-chair: K. Zaki, University of Maryland

|                 |                                                                                                        |           |
|-----------------|--------------------------------------------------------------------------------------------------------|-----------|
| <b>TU2B-1</b>   | <b>A Novel 15 to 45 GHz Monolithic Passive Balun for MMICs Applications</b>                            | <b>31</b> |
| <b>10:10 AM</b> | K.W. Hamed, A.P. Freundorfer, and Y.M.M. Antar                                                         |           |
| <b>TU2B-2</b>   | <b>A Dual-Band 3-dB Three-Port Power Divider Based on a Two-Section Transmission Line</b>              | <b>35</b> |
| <b>10:30 AM</b> | <b>Transformer</b><br>S. Srisathit, S. Virunphan, K. Bandudej, M. Chongcheawchamnan, and A. Worapishet |           |
| <b>TU2B-3</b>   | <b>Broadband 180° Bit Phase Shifter Using a New Switched Network</b>                                   | <b>39</b> |
| <b>10:40 AM</b> | S. Eom, S. Jeon, J. Chae, and J. Yook                                                                  |           |
| <b>TU2B-4</b>   | <b>Directivity Improvement of Microstrip Coupled Line Couplers Based on Equivalent Admittance</b>      | <b>43</b> |
| <b>10:50 AM</b> | <b>Approach</b><br>I. Ohta, T. Kawai, T. Fujii, and Y. Kokubo                                          |           |
| <b>TU2B-5</b>   | <b>Ultra-Thin Broadband OMT with Turnstile Junction</b>                                                | <b>47</b> |
| <b>11:00 AM</b> | Y. Aramaki, N. Yoneda, M. Miyazaki, and T. Horie                                                       |           |
| <b>TU2B-6</b>   | <b>Novel Invasive Electronic Tuning of Dielectric Resonators</b>                                       | <b>51</b> |
| <b>11:10 AM</b> | B.S. Virdee, A.S. Virdee, and L.A. Trinogga                                                            |           |
| <b>TU2B-7</b>   | <b>Miniature lumped element 180° Wilkinson Divider</b>                                                 | <b>55</b> |
| <b>11:20 AM</b> | H.S. Nagi                                                                                              |           |
| <b>TU2B-8</b>   | <b>A Novel Compact Uniplanar MMIC Wilkinson Power Divider with ACPS Series Stubs</b>                   | <b>59</b> |
| <b>11:30 AM</b> | K. Hettak, C.J. Verver, M.G. Stubbs, and G.A. Morin                                                    |           |
| <b>TU2B-9</b>   | <b>A Study of Meandered Microstrip Coupler with High Directivity</b>                                   | <b>63</b> |
| <b>11:40 AM</b> | S-M. Wang, C-H. Chen, and C-Y. Chang                                                                   |           |

## Session TU3B

### High Power Amplifiers

**10:10 – 11:50am**

**Room 204A**

**Tuesday, June 10, 2003**

Chair: K. Ikossi, Naval Research Laboratory

Co-chair: B. Luvush, Naval Research Laboratory

|                 |                                                                                                                             |           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>TU3B-1</b>   | <b>200W Push-Pull &amp; 110W Single-Ended High Performance RF-LDMOS Transistors for</b>                                     | <b>69</b> |
| <b>10:10 AM</b> | <b>WCDMA Basestation Applications</b><br>C.P. Dragon, W. Brakensiek, D. Burdeaux, W. Burger, G. Funk, M. Hurst, and D. Rice |           |
| <b>TU3B-2</b>   | <b>A 90W S-band High Power Amplifier for Broadband Wireless Applications</b>                                                | <b>73</b> |
| <b>10:30 AM</b> | K. Matsunaga and H. Shimawaki                                                                                               |           |
| <b>TU3B-3</b>   | <b>Highly Efficient Feed-Forward Amplifier using a Class-F Doherty Amplifier</b>                                            | <b>77</b> |
| <b>10:50 AM</b> | Y. Suzuki, T. Hirota, and T. Nojima                                                                                         |           |
| <b>TU3B-4</b>   | <b>An Adaptive Bias Controlled Power Amplifier with a Load-Modulated Combining Scheme for</b>                               | <b>81</b> |
| <b>11:10 AM</b> | <b>High Efficiency and Linearity</b><br>J. Cha, Y. Yang, B. Shin, and B. Kim                                                |           |

## Session TU4B

### Frequency Conversion and Control

10:10 – 11:50am

Room 204C

Tuesday, June 10, 2003

Chair: M. Madihian, NEC Laboratories America, Inc.

Co-chair: B. Matinpour, VT Silicon

|                 |                                                                                                          |            |
|-----------------|----------------------------------------------------------------------------------------------------------|------------|
| <b>TU4B-1</b>   | <b>Novel Sub-Harmonically Pumped Mixers Incorporating Dual-Band Quarter-Wave and In-Line Stub</b>        | <b>87</b>  |
| <b>10:10 AM</b> | T. Yum, Q. Xue, and C. Chan                                                                              |            |
| <b>TU4B-2</b>   | <b>A 40 GHz Communication Link With IF-Assisted Self-Heterodyne Direct Down Conversion</b>               | <b>91</b>  |
| <b>10:30 AM</b> | M. DeVincentis and T. Itoh                                                                               |            |
| <b>TU4B-3</b>   | <b>CMOS Mixer Linearization by the Low-Frequency Signal Injection Method</b>                             | <b>95</b>  |
| <b>10:50 AM</b> | C-F. Au-Yeung and K-K.M. Cheng                                                                           |            |
| <b>TU4B-4</b>   | <b>A Broadband HBT MMIC IQ Modulator and Millimeter-wave Vector Signal Characterization</b>              | <b>99</b>  |
| <b>11:10 AM</b> | H-Y. Chang, T-W. Huang, H. Wang, Y-C. Wang, P-C. Chao, and C-H. Chen                                     |            |
| <b>TU4B-5</b>   | <b>A Q-Band Uniplanar MMIC Diode Mixer with Lumped-Element Coplanar Waveguide-to-Slotline Transition</b> | <b>103</b> |
| <b>11:20 AM</b> | C-H. Wang, Y-S. Lin, H. Wang, and C. Chen                                                                |            |
| <b>TU4B-6</b>   | <b>A Miniaturized K-Band Balanced Frequency Doubler Using InGaP HBT Technology</b>                       | <b>107</b> |
| <b>11:40 AM</b> | D-W. Kang, D-H. Baek, S-H. Jeon, J-W. Park, and S. Hong                                                  |            |



## Session TU5B

### Millimeter Wave Monolithic IC Technologies

10:10 – 11:50am

Room 202A

Tuesday, June 10, 2003

Chair: T.T. Lee, Boeing Satellite Systems

Co-chair: H.A. Hung, Army Research Laboratory

|                 |                                                                                                           |            |
|-----------------|-----------------------------------------------------------------------------------------------------------|------------|
| <b>TU5B-1</b>   | <b>Low-Noise Performance Near BVCEO in a 200 GHz SiGe Technology at Different Collector Design Points</b> | <b>113</b> |
| <b>10:10 AM</b> | D.R. Greenberg, S. Sweeney, G. Freeman, and D. Ahlgren                                                    |            |
| <b>TU5B-2</b>   | <b>InP HBT Transimpedance Amplifier for 43 Gb/s Optical Link Applications</b>                             | <b>117</b> |
| <b>10:30 AM</b> | Z.M. Nosal and T.P.E. Broekaert                                                                           |            |
| <b>TU5B-3</b>   | <b>Bias circuit for High Yield Self-bias MMIC Amplifier for APAAs</b>                                     | <b>121</b> |
| <b>10:40 AM</b> | K. Yamanaka, K. Mori, H. Ikematsu, Y. Sasaki, and M. Nakayama                                             |            |
| <b>TU5B-4</b>   | <b>Monolithic Coplanar 77 GHz Balanced HEMT Mixer with Very Small Chip Size</b>                           | <b>125</b> |
| <b>10:50 AM</b> | H.J. Siweris and H. Tischer                                                                               |            |
| <b>TU5B-5</b>   | <b>A 120-GHz Millimeter-wave MMIC Chipset for Future Broadband Wireless Access Applications</b>           | <b>129</b> |
| <b>11:00 AM</b> | T. Kosugi, T. Shibata, T. Enoki, M. Muraguchi, A. Hirata, T. Nagatsuma, and H. Kyuragi                    |            |
| <b>TU5B-6</b>   | <b>A W-Band Monolithic Medium Power Amplifier</b>                                                         | <b>133</b> |
| <b>11:20 AM</b> | M.A. Morgan and S. Weinreb                                                                                |            |
| <b>TU5B-7</b>   | <b>95 GHz Metamorphic HEMT Power Amplifiers on GaAs</b>                                                   | <b>137</b> |
| <b>11:40 AM</b> | K.J. Herrick, S.M. Lardizabal, P.F. Marsh, and C.S. Whelan                                                |            |

## Session TU6B

### Microwave Photonic Devices

**10:10 – 11:50am**

**Room 202B**

**Tuesday, June 10, 2003**

Chair: C. Lee, University of Maryland  
Co-chair: K. Goverdhanan, Agere Systems

|                 |                                                                                                                                           |            |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>TU6B-1</b>   | <b>Optical Submillimeter-Wave Generation Employing Antenna Integrated Ultra-Fast Travelling-Wave 1.55<math>\mu</math>m Photodetectors</b> | <b>143</b> |
| <b>10:10 AM</b> | A. Malcoci, A. Stöhr, K. Lill, F. Siebe, P. van der Waal, A. Sauerwald, R. Güsten, and D. Jäger                                           |            |
| <b>TU6B-2</b>   | <b>Metamorphic Optoelectronic Integrated Circuits</b>                                                                                     | <b>147</b> |
| <b>10:30 AM</b> | R. Leoni, III, C.S. Whelan, P.F. Marsh, Y. Zhang, J.G. Hunt, C.S. Loughton, W.E. Hoke, and T.E. Kazior                                    |            |
| <b>TU6B-3</b>   | <b>Wide Bandwidth, High Performance Waveguide-Integrated P-I-N Photodiodes For 40 Gbits/s Receiver Modules</b>                            | <b>151</b> |
| <b>10:50 AM</b> | G. Wang, M. Takechi, K. Araki, T. Tokumitsu, I. Hanawa, Y. Yoneda, K. Sato, and M. Kobayashi                                              |            |
| <b>TU6B-4</b>   | <b>Investigation of the High Power Integrated Uni-Travelling Carrier and Waveguide Integrated Photodiode</b>                              | <b>155</b> |
| <b>11:10 AM</b> | T-S. Liao, P. Mages, P. Yu, E. Jacobs, and J. Sobti                                                                                       |            |
| <b>TU6B-5</b>   | <b>Photonic Tunable RF Filter with Reconfiguration Capabilities based on Arrayed Waveguide Gratings and Fiber Dispersion</b>              | <b>159</b> |
| <b>11:30 AM</b> | B. Vidal, V. Polo, J. Corral, and J. Martí                                                                                                |            |

## Session TU1C

### Microwave CAD Exploring Neural Networks and Fuzzy Logic

**1:20 – 3:00pm**

**Room 201A**

**Tuesday, June 10, 2003**

Chair: R. Biernacki, Agilent Technologies  
Co-chair: Q.J. Zang, Carleton University

|                |                                                                                                                                               |            |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>TU1C-1</b>  | <b>An Adjoint Dynamic Neural Network Technique for Exact Sensitivities in Nonlinear Transient Modeling and High-Speed Interconnect Design</b> | <b>165</b> |
| <b>1:20 PM</b> | Y. Cao, J. Xu, V.K. Devabhaktuni, R. Ding, and Q. Zhang                                                                                       |            |
| <b>TU1C-2</b>  | <b>EM-Based Design Tools for Microwave Circuits Using Fuzzy Logic Techniques</b>                                                              | <b>169</b> |
| <b>1:40 PM</b> | V. Mirafteb and R. Mansour                                                                                                                    |            |
| <b>TU1C-3</b>  | <b>Neuro-Space Mapping Technique for Nonlinear Device Modeling and Large Signal Simulation</b>                                                | <b>173</b> |
| <b>2:00 PM</b> | L. Zhang, J. Xu, M. Yagoub, R. Ding, and Q. Zhang                                                                                             |            |
| <b>TU1C-4</b>  | <b>Dynamically Configurable pHEMT Model Using Neural Networks for CAD</b>                                                                     | <b>177</b> |
| <b>2:20 PM</b> | B. Davis, C. White, M.A. Reece, M.E. Bayne, Jr., W.L. Thompson, N.L. Richardson, and L. Walker, Jr.                                           |            |
| <b>TU1C-5</b>  | <b>A Neural Network Modeling of Microwave Circuits on PBG Structures</b>                                                                      | <b>181</b> |
| <b>2:40 PM</b> | E.N. Queiroz Fernandes, P.H. da Fonseca Silva, A.G. d'Assunção, M. Barbosa de Melo, and M. Melo                                               |            |

# Session TU2C

## Focused Session – Negative Refractive Index Materials and Applications

**1:20 – 3:00pm**

**Room 201C**

**Tuesday, June 10, 2003**

Chair: T. Itoh, UCLA

Co-chair: A.A. Oliner, Polytechnique University of NY

|                |                                                                                                     |            |
|----------------|-----------------------------------------------------------------------------------------------------|------------|
| <b>TU2C-1</b>  | <b>Metamaterials with Negative Permittivity and Permeability: Background, Salient Features, and</b> | <b>187</b> |
| <b>1:20 PM</b> | <b>New Trends</b>                                                                                   |            |
|                | N. Engheta                                                                                          |            |
| <b>TU2C-2</b>  | <b>A Planar Negative-Refractive-Index Medium Without Resonant Elements</b>                          | <b>191</b> |
| <b>1:40 PM</b> | A. Oliner                                                                                           |            |
| <b>TU2C-3</b>  | <b>Novel Microwave Devices and Structures Based on the Transmission Line Approach of Meta-</b>      | <b>195</b> |
| <b>2:00 PM</b> | <b>Materials</b>                                                                                    |            |
|                | C. Caloz and T. Itoh                                                                                |            |
| <b>TU2C-4</b>  | <b>Sub-Wavelength Focusing in Loaded Transmission Line Negative Refractive Index</b>                | <b>199</b> |
| <b>2:20 PM</b> | <b>Metamaterials</b>                                                                                |            |
|                | A.K. Iyer, A. Grbic, and G.V. Eleftheriades                                                         |            |
| <b>TU2C-5</b>  | <b>Tailoring double negative metamaterial responses to achieve anomalous propagation effects</b>    | <b>203</b> |
| <b>2:40 PM</b> | <b>along microstrip transmission lines</b>                                                          |            |
|                | R.W. Ziolkowski and C-Y. Cheng                                                                      |            |



# Session TU3C

## Advances in High Power Transistor Technology

**1:20 – 3:00pm**

**Room 204A**

**Tuesday, June 10, 2003**

Chair: J. Crescenzi, Cree Microwave, Inc.

Co-chair: J. Goel, Northrop Grumman

|                |                                                                                                        |            |
|----------------|--------------------------------------------------------------------------------------------------------|------------|
| <b>TU3C-1</b>  | <b>Voltage Optimization for State of the Art RF-LDMOS for 2.1GHz W-CDMA Cellular</b>                   | <b>209</b> |
| <b>1:20 PM</b> | <b>Infrastructure Applications</b>                                                                     |            |
|                | H. Brech, W. Burger, C. Dragon, and B. Pryor                                                           |            |
| <b>TU3C-2</b>  | <b>Improved Electrical and Thermal Performance of Ultra-thin RF LDMOS Power Transistors</b>            | <b>213</b> |
| <b>1:40 PM</b> | J.A. Herbsommer, H. Safar, W. Brown, E.W. Lau, D.P. Farrell, P. Gammel, O. Lopez, and G. Terefenko     |            |
| <b>TU3C-3</b>  | <b>High performance RF Power LDMOSFET Technology for 2.1GHz Power Amplifier</b>                        | <b>217</b> |
| <b>2:00 PM</b> | <b>Applications</b>                                                                                    |            |
|                | S. Xu, A. Shibib, Z. Xie, H. Safar, J. Lott, D. Farrel, and M. Mastrapasqua                            |            |
| <b>TU3C-4</b>  | <b>High Temperature Performances of AlGaIn/GaN Power HFETs</b>                                         | <b>221</b> |
| <b>2:20 PM</b> | S. Nuttinck, B. Banerjee, S. Venkataraman, J. Laskar, and M. Harris                                    |            |
| <b>TU3C-5</b>  | <b>An 80W AlGaIn/GaN Heterojunction FET with a Field-Modulation Plate</b>                              | <b>225</b> |
| <b>2:30 PM</b> | Y. Okamoto, Y. Ando, H. Miyamoto, T. Nakayama, T. Inoue, and M. Kuzuhara                               |            |
| <b>TU3C-6</b>  | <b>Stability Analysis and Layout Design of an Internally Stabilized Multi-Finger FET for High</b>      | <b>229</b> |
| <b>2:50 PM</b> | <b>Power Base Station Amplifiers</b>                                                                   |            |
|                | S. Goto, T. Kunii, K. Fujii, A. Inoue, Y. Sasaki, Y. Hosokawa, R. Hattori, T. Ishikawa, and Y. Matsuda |            |

## Session TU4C

### Amplifiers and Control Circuits

**1:20 – 3:00pm**

**Room 202A**

**Tuesday, June 10, 2003**

Chair: V. Nair, Motorola, Inc.

Co-chair: H. Huang, AMCON Communication

|                |                                                                                                                             |            |
|----------------|-----------------------------------------------------------------------------------------------------------------------------|------------|
| <b>TU4C-1</b>  | <b>A 2 GHz High-Gain Differential InGaP HBT Driver Amplifier Matched for High IP3</b>                                       | <b>235</b> |
| <b>1:20 PM</b> | M.P. van der Heijden, M. Spirito, L.C.N. de Vreede, F. van Straten, and J.N. Burghartz                                      |            |
| <b>TU4C-2</b>  | <b>A 23GHz Differential Amplifier with Monolithically Integrated T-Coils in 0.09<math>\mu</math>m CMOS Technology</b>       | <b>239</b> |
| <b>1:40 PM</b> | T. Toifl, M. Kossel, C. Menolfi, T. Morf, and M. Schmatz                                                                    |            |
| <b>TU4C-3</b>  | <b>A Merged Structure of LNA &amp; Sub-Harmonic Mixer for Multi-band DCR Applications</b>                                   | <b>243</b> |
| <b>2:00 PM</b> | K-J. Koh, M-Y. Park, Y-S. Youn, S-H. Han, J-H. Choi, C-S. Kim, S-D. Kim, and H-K. Yu                                        |            |
| <b>TU4C-4</b>  | <b>A Novel Microwave Cross-Point Switch MMIC Employing Thyristors For Broadband Services</b>                                | <b>247</b> |
| <b>2:20 PM</b> | R.A. La Rue, T. Phuoc Ngo, E. Chan, J.D. Levine, N. Kinayman, D. Hoag, J. Goodrich, R. Anderson, T. Boles, and J-P. Lanteri |            |
| <b>TU4C-5</b>  | <b>Performance of AlGaIn/GaN HEMTs for 2.8 GHz and 10 GHz Power Amplifier Applications</b>                                  | <b>251</b> |
| <b>2:40 PM</b> | A. Zhang, L. Rowland, E. Kaminsky, J. Kretchmer, V. Tilak, A. Allen, and B. Edward                                          |            |
| <b>TU4C-6</b>  | <b>Heterojunction PIN Diode Switch</b>                                                                                      | <b>255</b> |
| <b>2:50 PM</b> | D.R. Hoag, J. Brogle, T. Boles, D. Curcio, and D. Russell                                                                   |            |

## Session TU5C

### Microwave Photonic Systems

**1:20 – 3:00pm**

**Room 202B**

**Tuesday, June 10, 2003**

Chair: B. Jemison, Lafayette College

Co-chair: T. Berceli, BUTE

|                |                                                                                                                                                                    |            |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>TU5C-1</b>  | <b>Simultaneous 3-band modulation 2.5-Gb/s baseband, microwave-, and 60-GHz-band signals using a single electroabsorption modulator for radio-on-fiber systems</b> | <b>261</b> |
| <b>1:20 PM</b> | K. Ikeda, T. Kuri, and K-i. Kitayama                                                                                                                               |            |
| <b>TU5C-2</b>  | <b>Combined digital/wireless link over the Multi-Mode Fiber with a Vertical Cavity Surface Emitting Laser</b>                                                      | <b>265</b> |
| <b>1:40 PM</b> | M. Maeng, Y. Hur, N. Lal, K. Lim, E. Gebara, S. Yoon, and J. Laskar                                                                                                |            |
| <b>TU5C-3</b>  | <b>110 KM 256-QAM Digital Microwave Over Fiber Link</b>                                                                                                            | <b>269</b> |
| <b>2:00 PM</b> | E. Funk, V. Urick, S. Strutz, J. Dexter, and K. Williams                                                                                                           |            |
| <b>TU5C-4</b>  | <b>The merging of a WDM fiber-radio backbone with a 25 GHz WDM ring network</b>                                                                                    | <b>273</b> |
| <b>2:20 PM</b> | C. Lim, A. Nirmalathas, M. Attygalle, D. Novak, and R. Waterhouse                                                                                                  |            |
| <b>TU5C-5</b>  | <b>Experimental reduction of fiber-induced intensity noise in analog optical links employing chirped fiber Bragg gratings</b>                                      | <b>277</b> |
| <b>2:30 PM</b> | J. Marti, F. Ramos, and V. Polo                                                                                                                                    |            |
| <b>TU5C-6</b>  | <b>Integrated Polymer Photonic RF Phase Shifters for Optically Controlled Beam Forming Systems</b>                                                                 | <b>281</b> |
| <b>2:40 PM</b> | J. Han, B-J. Seo, and H. Fetterman                                                                                                                                 |            |

## Session TU1D

### Frequency-Domain CAD Techniques

**3:30 – 5:10pm**

**Room 201A**

**Tuesday, June 10, 2003**

Chair: K.C. Gupta, University of Colorado at Boulder

Co-chair: K. Naishadham, MIT Lincoln Laboratories

|                |                                                                                                 |            |
|----------------|-------------------------------------------------------------------------------------------------|------------|
| <b>TU1D-1</b>  | <b>Multiport MM/FE Technique for the Efficient CAD of Folded and Cross-Coupled Rectangular</b>  | <b>287</b> |
| <b>3:30 PM</b> | <b>Combine Filters</b>                                                                          |            |
|                | F. Arndt and J. Brandt                                                                          |            |
| <b>TU1D-2</b>  | <b>EM Based Design Of Large-Scale Dielectric Resonator Multiplexers By Space Mapping</b>        | <b>291</b> |
| <b>3:50 PM</b> | M.A. Ismail, D. Smith, A. Panariello, Y. Wang, and M. Yu                                        |            |
| <b>TU1D-3</b>  | <b>Minimal-Order Multi-Dimensional Linear Interpolation for a Parameterized Electromagnetic</b> | <b>295</b> |
| <b>4:10 PM</b> | <b>Model Database</b>                                                                           |            |
|                | J. Sercu and S. Hammadi                                                                         |            |
| <b>TU1D-4</b>  | <b>Feasible Adjoint Sensitivity Technique for EM Design Exploiting Broyden's Update</b>         | <b>299</b> |
| <b>4:30 PM</b> | R. Safian, N.K. Nikolova, M.H. Bakr, and J.W. Bandler                                           |            |
| <b>TU1D-5</b>  | <b>De-embedding of Port Discontinuities in Full-Wave CAD Models of Multi-Port Circuits</b>      | <b>303</b> |
| <b>4:50 PM</b> | V.I. Okhmatovski, J. Morsey, and A.C. Cangellaris                                               |            |

## Session TU2D

### Negative Index Materials and Microwave Applications

**3:30 – 5:10pm**

**Room 201C**

**Tuesday, June 10, 2003**

Chair: A.A. Oliner, Polytechnic University of NY

Co-chair: T. Itoh, UCLA

|                |                                                                                                  |            |
|----------------|--------------------------------------------------------------------------------------------------|------------|
| <b>TU2D-1</b>  | <b>Electronic Aspects of Propagation in Left-Handed Guided Wave Structures: Electromagnetic-</b> | <b>309</b> |
| <b>3:30 PM</b> | <b>Media Interactions</b>                                                                        |            |
|                | C.M. Krowne and M. Daniel                                                                        |            |
| <b>TU2D-2</b>  | <b>Mono-Modal Waveguides Filled with a Pair of Parallel Epsilon-Negative (ENG) and Mu-</b>       | <b>313</b> |
| <b>3:50 PM</b> | <b>Negative (MNG) Metamaterial Layers</b>                                                        |            |
|                | A. Alù and N. Engheta                                                                            |            |
| <b>TU2D-3</b>  | <b>A Broadband Left-Handed (LH) Coupled-Line Backward Coupler with Arbitrary Coupling</b>        | <b>317</b> |
| <b>4:10 PM</b> | <b>Level</b>                                                                                     |            |
|                | C. Caloz, A. Sanada, L. Liu, and T. Itoh                                                         |            |
| <b>TU2D-4</b>  | <b>A Planar Metamaterial Co-Directional Coupler That Couples Power Backwards</b>                 | <b>321</b> |
| <b>4:20 PM</b> | R. Islam and G.V. Eleftheriades                                                                  |            |
| <b>TU2D-5</b>  | <b>A Branch-Line Coupler with Two Arbitrary Operating Frequencies Using Left-Handed</b>          | <b>325</b> |
| <b>4:30 PM</b> | <b>Transmission Lines</b>                                                                        |            |
|                | I-H. Lin, C. Caloz, and T. Itoh                                                                  |            |
| <b>TU2D-6</b>  | <b>A Compact Enhanced-Bandwidth Hybrid Ring using a Left-Handed Transmission Line Section</b>    | <b>329</b> |
| <b>4:50 PM</b> | H. Okabe, C. Caloz, and T. Itoh                                                                  |            |



## Session TU3D

### High Power Amplifier Linearization

**3:30 – 5:10pm**

**Room 204A**

**Tuesday, June 10, 2003**

Chair: A. Katz, The College of New Jersey  
Co-chair: S. Cripps, Linearizer Technology, Inc.

|                |                                                                                                                            |            |
|----------------|----------------------------------------------------------------------------------------------------------------------------|------------|
| <b>TU3D-1</b>  | <b>The Linearized Microwave Power Module</b>                                                                               | <b>335</b> |
| <b>3:30 PM</b> | D. Katz and R. Gray                                                                                                        |            |
| <b>TU3D-2</b>  | <b>A Novel Predistorter using a Balanced Type IM3 Generator</b>                                                            | <b>339</b> |
| <b>3:50 PM</b> | S-W. Kim, H. Jeong, C. Kim, and I. Chang                                                                                   |            |
| <b>TU3D-3</b>  | <b>Statistical Modeling of Cross Modulation in Multichannel Power Amplifiers Using a New Behavioral Modeling Technique</b> | <b>343</b> |
| <b>4:10 PM</b> | K. Gharaibeh and M. Steer                                                                                                  |            |
| <b>TU3D-4</b>  | <b>Closed-Loop Digital Pre-Distortion for Power Amplifier Linearization using Genetic Algorithms</b>                       | <b>347</b> |
| <b>4:20 PM</b> | R. Sperlich, J. Sills, and J. Kenney                                                                                       |            |
| <b>TU3D-5</b>  | <b>Dynamic Electro-Thermal Behavioral Model for RF Power Amplifiers</b>                                                    | <b>351</b> |
| <b>4:40 PM</b> | S. Boumaiza, J. Gauthier, and F.M. Ghannouchi                                                                              |            |

## Session TU4D

### Focused Session (Joint with RFIC) – Ultra-Wideband Communications & Radar: Entering the Marketplace

**3:30 – 5:10pm**

**Room 204C**

**Tuesday, June 10, 2003**

Chair: G. Lyons, MIT Lincoln Laboratory  
Co-chair: R. Kaul, Johns Hopkins University

|                |                                                                                                    |            |
|----------------|----------------------------------------------------------------------------------------------------|------------|
| <b>TU4D-1</b>  | <b>Ultrawideband: The Next Step in Short-Range Wireless</b>                                        | <b>357</b> |
| <b>3:30 PM</b> | D.G. Leeper                                                                                        |            |
| <b>TU4D-2</b>  | <b>Challenges for Ultra-wideband (UWB) CMOS integration.</b>                                       | <b>361</b> |
| <b>3:50 PM</b> | G. Aiello                                                                                          |            |
| <b>TU4D-3</b>  | <b>UWB Path Loss Characterization In Residential Environments</b>                                  | <b>365</b> |
| <b>4:10 PM</b> | S.S. Ghassemzadeh and V. Tarokh                                                                    |            |
| <b>TU4D-5</b>  | <b>Ultra Wide Band 24 GHz Automotive Radar Front-End</b>                                           | <b>369</b> |
| <b>4:50 PM</b> | I. Gresham, A. Jenkins, R. Egri, C. Eswarappa, F. Kolak, R. Wohler, J. Bennett, and J-P.T. Lanteri |            |
| <b>TU4D-6</b>  | <b>1.25Gbps Wireless Gigabit Ethernet Link at 60GHz-Band</b>                                       | <b>373</b> |
| <b>5:10 PM</b> | K. Ohata, K. Maruhashi, M. Ito, S. Kishimoto, K. Ikuina, T. Hashiguchi, K. Ikeda, and N. Takahashi |            |

## Session TU5D

### Biological Effects and Medical Applications

3:30 – 5:10pm

Room 202A

Tuesday, June 10, 2003

Chair: A. Vander Vorst, Microwaves UCL  
Co-chair: M. Stuchly, University of Victoria

|                |                                                                                                                                                  |            |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>TU5D-1</b>  | <b>Experimental investigation of microwave imaging via space-time beamforming for breast cancer detection</b>                                    | <b>379</b> |
| <b>3:30 PM</b> | X. Li, S.C. Hagness, B.D. Van Veen, and D. van der Weide                                                                                         |            |
| <b>TU5D-2</b>  | <b>Experimental Feasibility of Breast Tumor Detection and Localization</b>                                                                       | <b>383</b> |
| <b>3:50 PM</b> | E.C. Fear, J. Sill, and M.A. Stuchly                                                                                                             |            |
| <b>TU5D-3</b>  | <b>Breast Tumor Characterization Via Complex Natural Resonances</b>                                                                              | <b>387</b> |
| <b>4:10 PM</b> | Y. Huo, R. Bansal, and Q. Zhu                                                                                                                    |            |
| <b>TU5D-4</b>  | <b>A Conformal Microwave Antenna Applicator for Circumferential Ablation</b>                                                                     | <b>391</b> |
| <b>4:20 PM</b> | Z. Gu, C.M. Rappaport, P.J. Wang, and W. Zhu                                                                                                     |            |
| <b>TU5D-5</b>  | <b>FDTD Simulation of Interstitial Arrays of Sleeved-Slot Antennas for Hyperthermic Cancer Therapy</b>                                           | <b>395</b> |
| <b>4:30 PM</b> | P.I. Bernardi, M. Cavagnaro, J.C. Lin, S. Pisa, and E. Piuze                                                                                     |            |
| <b>TU5D-6</b>  | <b>110 GHz Broadband Measurement of Permittivity on Human Epidermis Using 1mm Coaxial Probe</b>                                                  | <b>399</b> |
| <b>4:40 PM</b> | H. Hwang, J. Yim, J-W. Cho, C. Cheon, and Y. Kwon                                                                                                |            |
| <b>TU5D-7</b>  | <b>A UTD/FDTD Model to Evaluate Human Exposure to Base-Station Antennas in Realistic Urban Environments</b>                                      | <b>403</b> |
| <b>4:50 PM</b> | P.I. Bernardi, M. Cavagnaro, R. Cicchetti, S. Pisa, E. Piuze, and O. Testa                                                                       |            |
| <b>TU5D-8</b>  | <b>Investigation of Specific Absorption Rate of Electromagnetic fields at 100MHz in The Head of a Person Wearing Hoodless Protection Garment</b> | <b>407</b> |
| <b>5:00 PM</b> | A. Hadjem, D. Lautru, C. Dale, M. Wong, J. Wiart, F. Jacquin, and V. Fouad Hanna                                                                 |            |

## Session TU6D

### Ferrite and Control Devices

3:30 – 5:10pm

Room 202B

Tuesday, June 10, 2003

Chair: S. Stitzer, Northrop Grumman  
Co-chair: B. Elsharawy, Arizona State University

|                |                                                                                                                        |            |
|----------------|------------------------------------------------------------------------------------------------------------------------|------------|
| <b>TU6D-1</b>  | <b>An Optically Controlled Isolator using Ferrite Edge Mode</b>                                                        | <b>413</b> |
| <b>3:30 PM</b> | T. Koda                                                                                                                |            |
| <b>TU6D-2</b>  | <b>Improved Lumped-Element Two-Port Isolator</b>                                                                       | <b>417</b> |
| <b>3:50 PM</b> | S. Takeda, H. Mikami, and K. Ichikawa                                                                                  |            |
| <b>TU6D-3</b>  | <b>Novel General Finite Element Solver for Gyroelectric Structures</b>                                                 | <b>421</b> |
| <b>4:00 PM</b> | L. Tio, L. Davis, A. Gibson, and B. Dillon                                                                             |            |
| <b>TU6D-4</b>  | <b>Microstrip Line on the Oppositely Magnetized Ferrite Substrate and its Application to the Nonreciprocal Devices</b> | <b>425</b> |
| <b>4:20 PM</b> | K. Okubo and M. Tsutsumi                                                                                               |            |
| <b>TU6D-5</b>  | <b>Microwave Permeability Measurement of Unsaturated Hexaferrites of Y-type</b>                                        | <b>429</b> |
| <b>4:30 PM</b> | M. Obol and C. Vittoria                                                                                                |            |
| <b>TU6D-6</b>  | <b>Ultra Broadband Ferrite Transmission Line Transformer</b>                                                           | <b>433</b> |
| <b>4:40 PM</b> | J. Horn and G. Boeck                                                                                                   |            |
| <b>TU6D-7</b>  | <b>Low Loss Phase Shifter Based on Piezo-Controlled Layered Dielectric Structure</b>                                   | <b>437</b> |
| <b>5:00 PM</b> | Y. Poplavko, V. Kazmirenko, Y. Prokopenko, M. Jeong, and S. Baik                                                       |            |



# Session TUIF

## Tuesday Interactive Forum

**1:30 – 4:30pm**

**Grand Hall**

**Tuesday, June 10, 2003**

Chair: A. Katz, The College of New Jersey  
Co-chair: Z. Turski, Sarnoff Corp.

|                |                                                                                                                                  |            |
|----------------|----------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>TUIF-1</b>  | <b>A complete self-defined empirical model for enhancement-mode AlGaAs/InGaAs pHEMTs</b>                                         | <b>443</b> |
| <b>1:30 PM</b> | W-K. Wang, C-K. Lin, C-C. Wu, and Y-J. Chan                                                                                      |            |
| <b>TUIF-2</b>  | <b>ANN Model For AlGaIn/GaN HEMTs Constructed From Near-Optimal-Load Large-Signal</b>                                            | <b>447</b> |
| <b>1:30 PM</b> | <b>Measurements</b><br>D. Schreurs, J. Verspecht, E. Vandamme, N. Vellas, C. Gaquiere, M. Germain, and G. Borghs                 |            |
| <b>TUIF-3</b>  | <b>Large Signal Modeling of AlGaIn/GaN HEMTs with Psat &gt; 4 W/mm at 30 GHz suitable for</b>                                    | <b>451</b> |
| <b>1:30 PM</b> | <b>Broadband Power Applications</b><br>D. van Raay, D. Quay, R. Kiefer, M. Schlechtweg, and G. Weimann                           |            |
| <b>TUIF-4</b>  | <b>Mechanism of Power Density Degradation due to Trapping Effects in AlGaIn/GaN HEMTs</b>                                        | <b>455</b> |
| <b>1:30 PM</b> | S. De Meyer, C. Charbonniaud, R. Quéré, M. Campovecchio, R. Lossy, and J. Würfl                                                  |            |
| <b>TUIF-5</b>  | <b>Analysis of RF Performances of GaN MESFETs Including Self-Heating and Trapping Effects</b>                                    | <b>459</b> |
| <b>1:30 PM</b> | S.S. Islam and A. Anwar                                                                                                          |            |
| <b>TUIF-6</b>  | <b>A Recursive Scheme for MESFET Nonlinear Current Coefficient Evaluation Applied in</b>                                         | <b>463</b> |
| <b>1:30 PM</b> | <b>Volterra-Series Analysis</b><br>C-C. Huang and H-T. Pai                                                                       |            |
| <b>TUIF-7</b>  | <b>A Large-Signal FET Model Including Thermal and Trap Effects with Pulsed I-V Measurements</b>                                  | <b>467</b> |
| <b>1:30 PM</b> | K. Koh, H-M. Park, and S. Hong                                                                                                   |            |
| <b>TUIF-8</b>  | <b>Novel configuration of a SAW-Dielectric antenna duplexer for Personal Digital Cellular (PDC)</b>                              | <b>471</b> |
| <b>1:30 PM</b> | <b>phone system with simultaneously transmit-receive packet mode scheme</b><br>T. Ishizaki, H. Nakamura, K. Fujii, and Y. Takeda |            |
| <b>TUIF-9</b>  | <b>Design and Fabrication of Square Shaped Ceramic Resonator Filter for NRD Guide Integrated</b>                                 | <b>475</b> |
| <b>1:30 PM</b> | <b>Circuit at 60GHz</b><br>F. Kuroki, H. Shimoi, M. Yamaguchi, Y. Minamitani, and T. Yoneyama                                    |            |
| <b>TUIF-10</b> | <b>Mixed-Resonance Compact In-Line Pseudo-Elliptic Filters</b>                                                                   | <b>479</b> |
| <b>1:30 PM</b> | U. Rosenberg, S. Amari, and J. Bornemann                                                                                         |            |
| <b>TUIF-11</b> | <b>Two Movable Plate Nitride Loaded MEMS Variable Capacitor</b>                                                                  | <b>483</b> |
| <b>1:30 PM</b> | M. Bakri-Kassem and R. Mansour                                                                                                   |            |
| <b>TUIF-12</b> | <b>A 12GHz Lumped-element Hybrid Fabricated on a Micromachined Dielectric-Air-Metal (DAM)</b>                                    | <b>487</b> |
| <b>1:30 PM</b> | <b>Cavity</b><br>T. Nishino, Y. Yoshida, Y. Suehiro, S-S. Lee, K. Miyaguchi, T. Fukami, H. Oh-hashii, and O. Ishida              |            |
| <b>TUIF-13</b> | <b>Micro-Bias-Tees Using Micromachined Flip-Chip Inductors</b>                                                                   | <b>491</b> |
| <b>1:30 PM</b> | P.J. Bell, N. Hoivik, V.M. Bright, and Z. Popovic                                                                                |            |
| <b>TUIF-14</b> | <b>Dielectric Fluid Immersed MEMS Tunable Capacitors</b>                                                                         | <b>495</b> |
| <b>1:30 PM</b> | D.T. McCormick, Z. Li, and N. Tien                                                                                               |            |
| <b>TUIF-15</b> | <b>A MEMS Shunt Switch on a Dielectric Membrane</b>                                                                              | <b>499</b> |
| <b>1:30 PM</b> | J. Nithianandam                                                                                                                  |            |
| <b>TUIF-16</b> | <b>A 25 Watt RF MEM-tuned VHF Bandpass Filter</b>                                                                                | <b>503</b> |
| <b>1:30 PM</b> | C.A. Hall, R.C. Luetzelshwab, R.D. Streeter, and J.H. VanPatten                                                                  |            |
| <b>TUIF-17</b> | <b>High Density RF MIM Capacitors Using High-k AlTaOx Dielectrics</b>                                                            | <b>507</b> |
| <b>1:30 PM</b> | C. Huang, M. Yang, A. Chin, C. Zhu, M. Li, and D. Kwong                                                                          |            |
| <b>TUIF-18</b> | <b>Coalesced Single-Input Single-Output Dual-Band Filter</b>                                                                     | <b>511</b> |
| <b>1:30 PM</b> | C-H. Chang, H-S. Wu, H. Yang, and C-K. Tzuang                                                                                    |            |
| <b>TUIF-19</b> | <b>A Miniatured 2.4 GHz Band Multi-layer Bandpass Filter Using Capacitively Loaded <math>\lambda/4</math> Slow-</b>              | <b>515</b> |
| <b>1:30 PM</b> | <b>wave Resonator</b><br>H-S. Song and Y-S. Lee                                                                                  |            |

|                                  |                                                                                                                                                                                                                                            |            |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>TUIF-20</b><br><b>1:30 PM</b> | <b>A Novel Design Method for Improvement of Narrow Band-pass Planar Filter Response</b><br>G. Prigent, E. Rius, F. Le Pennec, S. Le Maguer, and C. Quendo                                                                                  | <b>519</b> |
| <b>TUIF-21</b><br><b>1:30 PM</b> | <b>Bandwidth and central frequency control on tunable bandpass filter by using MEMS cantilevers</b><br>E. Fourn, C. Quendo, E. Rius, A. Pothier, P. Blondy, C. Champeaux, J.C. Orlianges, A. Catherinot, G. Tanné, C. Person, and F. Huret | <b>523</b> |
| <b>TUIF-22</b><br><b>1:30 PM</b> | <b>Design of Multilayer Spiral Inductor Resonator Filter and Diplexer for System-In-a-Package</b><br>G-A. Lee, M. Megahed, and F. De Flaviis                                                                                               | <b>527</b> |
| <b>TUIF-24</b><br><b>1:30 PM</b> | <b>Improvement of Characteristics Using Cross Patch in the LTCC Filter</b><br>J. Hayashi and Y. Nikawa                                                                                                                                     | <b>531</b> |
| <b>TUIF-25</b><br><b>1:30 PM</b> | <b>An Elliptic Low-pass Filter With Shorted Cross-over and Broadside-coupled Microstrip Lines</b><br>N. Yang, Z.N. Chen, Y.Y. Wang, and M. Chia                                                                                            | <b>535</b> |
| <b>TUIF-26</b><br><b>1:30 PM</b> | <b>Modified Microstrip Filters Improving The Suppression Performance of Harmonic Signals</b><br>B. Kim, J. Lee, and M. Song                                                                                                                | <b>539</b> |
| <b>TUIF-27</b><br><b>1:30 PM</b> | <b>New Parallel Lambda/2-Microstrip Line Filters with Transmission Zeros at Finite Frequencies</b><br>S. Amari, G. Tadeson, J. Cihlar, and U. Rosenberg                                                                                    | <b>543</b> |
| <b>TUIF-28</b><br><b>1:30 PM</b> | <b>Harmonic Balance algorithm to model nonlinear effects in HTS filters subject to CDMA signals</b><br>J. Mateu, C. Collado, and J.M. O'Callaghan                                                                                          | <b>547</b> |
| <b>TUIF-29</b><br><b>1:30 PM</b> | <b>Superconducting Microstrip Wide Band Filter for Radio Astronomy</b><br>Y. Li, M.J. Lancaster, F. Huang, and N. Roddis                                                                                                                   | <b>551</b> |
| <b>TUIF-30</b><br><b>1:30 PM</b> | <b>A Low-power 435-MHz SOI CMOS LNA and Mixer</b><br>E. Zencir, N.S. Dogan, and E. Arvas                                                                                                                                                   | <b>555</b> |
| <b>TUIF-31</b><br><b>1:30 PM</b> | <b>A New Scaleable Low Frequency Noise Model for Field-Effect Transistors Used in Resistive Mixers</b><br>M. Margraf and G. Boeck                                                                                                          | <b>559</b> |
| <b>TUIF-32</b><br><b>1:30 PM</b> | <b>A Compact Direct Detection Receiver for L-band STAR Radiometry</b><br>L. van Nieuwstadt, R. De Roo, D. Boprie, R. Rizor, P. Hansen, A.W. England, H. Pham, and B. Lim                                                                   | <b>563</b> |
| <b>TUIF-33</b><br><b>1:30 PM</b> | <b>Architecture and Interconnect Technologies for a Novel Conformal Active Phased Array Radar Module</b><br>M. Schreiner, H. Leier, W. Menzel, and H-P. Feldle                                                                             | <b>567</b> |
| <b>TUIF-34</b><br><b>1:30 PM</b> | <b>High Gain Wideband Compact Microstrip Antenna With Quasi-Planner Surface Mount Horn</b><br>A. Rahman, A.K. Verma, and A.S. Omar                                                                                                         | <b>571</b> |
| <b>TUIF-35</b><br><b>1:30 PM</b> | <b>Simulation of the Performance of Smart Antennas in the Reverse Link of CDMA System</b><br>S. Durrani and M.E. Bialkowski                                                                                                                | <b>575</b> |
| <b>TUIF-36</b><br><b>1:30 PM</b> | <b>A Broadband Beamformer for Millimeter-Wave Systems Using Sub-Band Sampling</b><br>S-S. Jeon, J-Y. Park, Y. Wang, and T. Itoh                                                                                                            | <b>579</b> |
| <b>TUIF-37</b><br><b>1:30 PM</b> | <b>Components of a Highly Integrated DBF Terminal Antenna for Mobile Ka-Band Satellite Communications</b><br>L.C. Stange, H. Pawlak, A. Dreher, S. Holzwarth, A. Jacob, O. Litschke, and M. Thiel                                          | <b>583</b> |
| <b>TUIF-38</b><br><b>1:30 PM</b> | <b>Radiation Characteristics of Microstrip Dipole Antennas over a High-Impedance Metamaterial Surface made of Hilbert Inclusions</b><br>J.A. McVay, A. Hoofar, and N. Engheta                                                              | <b>587</b> |
| <b>TUIF-39</b><br><b>1:30 PM</b> | <b>An Efficient Approach for Characterizing Power Combining Dividing Network of Distributed Phased Array Antenna</b><br>J. Abdulnour and K. Wu                                                                                             | <b>591</b> |
| <b>TUIF-40</b><br><b>1:30 PM</b> | <b>A New 94 GHz Collision Avoidance Radar Sensor Using Six-Port Phase Frequency Discriminator</b><br>E. Moldovan, S.O. Tatu, T. Gaman, K. Wu, and R.G. Bosisio                                                                             | <b>595</b> |
| <b>TUIF-41</b><br><b>1:30 PM</b> | <b>Retro-directive Noise Correlation Radar with Extremely Low Acquisition Time</b><br>S. Gupta and E.R. Brown                                                                                                                              | <b>599</b> |
| <b>TUIF-42</b><br><b>1:30 PM</b> | <b>Wavelet-based Impulse Reconstruction in UWB-Radar</b><br>K. Pourvoyeur, A. Stelzer, G. Ossberger, T. Buchegger, and M. Pichler                                                                                                          | <b>603</b> |

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| <b>TUIF-43</b> | <b>A Novel Signal Processing Technique for Vehicle Detection Radar</b>                                                | <b>607</b> |
| <b>1:30 PM</b> | S-J. Park, T-Y. Kim, S-M. Kang, and K-H. Koo                                                                          |            |
| <b>TUIF-44</b> | <b>Integrated Radar and Communications based on Chirped Spread-Spectrum Techniques</b>                                | <b>611</b> |
| <b>1:30 PM</b> | M. Robertson and E. Brown                                                                                             |            |
| <b>TUIF-45</b> | <b>A Ka-Band Class F MMIC Amplifier Design Utilizing Adaptable Knowledge-Based Neural Network Modeling Techniques</b> | <b>615</b> |
| <b>1:30 PM</b> | M.A. Reece, C. White, J. Penn, B. Davis, M. Bayne, N. Richardson, W. Thompson, and L. Walker                          |            |
| <b>TUIF-46</b> | <b>Giga-bit Class Ultra High Speed Signal Wireless Distribution by Using NRD Guide Technology at 60GHz</b>            | <b>619</b> |
| <b>1:30 PM</b> | F. Kuroki, M. Yamaguchi, T. araki, H. Sato, and T. Yoneyama                                                           |            |
| <b>TUIF-47</b> | <b>3D Indoor Micro Location Using a Stereoscopic Microwave Phase Sensitive Device</b>                                 | <b>623</b> |
| <b>1:30 PM</b> | A. Benlarbi-Delai and J. Cousin                                                                                       |            |
| <b>TUIF-48</b> | <b>Adaptive Feedback Interference Cancellation System</b>                                                             | <b>627</b> |
| <b>1:30 PM</b> | S. Kim, J. Lee, J. Lee, B. Lee, and N. Kim                                                                            |            |

## Session TUIF

### Tuesday Interactive Forum (RFIC Papers)

**1:30 – 4:30pm**

**Grand Hall**

**Tuesday, June 10, 2003**

Chair: A. Katz, The College of New Jersey

Co-chair: Z. Turski, Sarnoff Corp.

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| <b>TUIF-49</b> | <b>Fully integrated Sigma-Delta Synthesizer Suitable for "Indirect VCO modulation" in 2.5G application</b>                                                                                                     | <b>A1</b>  |
| <b>1:30 PM</b> | B. Bisanti, S. Cipriani, L. Carpineto, F. Coppola, E. Duvivier, N. Mouralis, D. Ercole, G. Puccio, V. Rousset, and S. Cercelaru                                                                                |            |
| <b>TUIF-50</b> | <b>An Antenna Switch MMIC Using E/D Mode p-HEMT for GSM/DCS/PCS/WCDMA Bands Application</b>                                                                                                                    | <b>A5</b>  |
| <b>1:30 PM</b> | H. Tosaka, T. Fujii, K. Miyakoshi, K. Ikenaka, and M. Takahashi                                                                                                                                                |            |
| <b>TUIF-51</b> | <b>New Results on MMIC Six-Port's used in Ka Band Direct Conversion Receivers</b>                                                                                                                              | <b>A9</b>  |
| <b>1:30 PM</b> | S. Tatu, E. Moldovan, G. Brehm, K. Wu, and R. Bosisio                                                                                                                                                          |            |
| <b>TUIF-52</b> | <b>Design and Analysis of On-Chip Symmetric Parallel-Plate Coupled-Line Balun for Silicon RF Integrated Circuits</b>                                                                                           | <b>A13</b> |
| <b>1:30 PM</b> | H. Yang and J.A. Castaneda                                                                                                                                                                                     |            |
| <b>TUIF-53</b> | <b>Analysis and verification on side effect of anti-backlash delay in phase-frequency detector</b>                                                                                                             | <b>A17</b> |
| <b>1:30 PM</b> | X. Zhang                                                                                                                                                                                                       |            |
| <b>TUIF-54</b> | <b>A CMOS Voltage-to-Frequency Linearizing Preprocessor for Parallel Plate RF MEMS Varactors</b>                                                                                                               | <b>A21</b> |
| <b>1:30 PM</b> | M.S. McCorquodale, M. Ding, and R.B. Brown                                                                                                                                                                     |            |
| <b>TUIF-55</b> | <b>Third Generation Wireless Signal Profiling</b>                                                                                                                                                              | <b>A25</b> |
| <b>1:30 PM</b> | C.Y. Ho, T.K. Lam, and V.N. Tran                                                                                                                                                                               |            |
| <b>TUIF-56</b> | <b>Characterization and Modeling of Size Effect on the Performances of 0.10 um RF MOSFETs for SOC Applications</b>                                                                                             | <b>A29</b> |
| <b>1:30 PM</b> | Y-S. Lin, H-Y. Tu, H-W. Chiu, and S-S. Lu                                                                                                                                                                      |            |
| <b>TUIF-57</b> | <b>Design and Modeling of A High-Q On-Chip Hairpin Inductor for RFIC Applications</b>                                                                                                                          | <b>A33</b> |
| <b>1:30 PM</b> | W. Ni, X. Yuan, Y. Tretiakov, R. Groves, and L. Larson                                                                                                                                                         |            |
| <b>TUIF-58</b> | <b>Design Techniques to combat Process, Temperature and Supply variations in Bluetooth RFIC</b>                                                                                                                | <b>A37</b> |
| <b>1:30 PM</b> | Y. Theng Tee, Y. Hwa Seng, L. Poh Boon, T. Kwang Hung, S. Tachi, K. Soo Ling, T. Murakami, S. Jin Hui, L. Choon Tiong, T. Lin Choon, W. Wing Kheng, X. Qi Jun, L. Chiao Meng, L. Shio Hwi, X. Wei, and M. Itoh |            |

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|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>TUIF-59</b><br><b>1:30 PM</b> | <b>Wideband CMOS Integrated RF Combiner for LINC Transmitters</b><br>S. Hamed-Hagh and C. Salama                                                                                                                                                     | <b>A41</b>  |
| <b>TUIF-60</b><br><b>1:30 PM</b> | <b>Second Order Nonlinearity Analysis of Gilbert Mixer</b><br>S. Kang and B. Kim                                                                                                                                                                     | <b>A45</b>  |
| <b>TUIF-61</b><br><b>1:30 PM</b> | <b>Improving the Isolation of GPS Receivers for Integration with Wireless Communication Systems</b><br>S. Spiegel, A. Thiel, S. Nussbaumer, I. Kovacs, and M. Durler                                                                                 | <b>A49</b>  |
| <b>TUIF-62</b><br><b>1:30 PM</b> | <b>An Improved But Reliable Model for MESFET Parasitic Capacitance Extraction</b><br>B.L. Ooi and J.Y. Ma                                                                                                                                            | <b>A53</b>  |
| <b>TUIF-63</b><br><b>1:30 PM</b> | <b>Straightforward Transient &amp; Noise Analysis for <math>\Sigma\Delta</math> PLL-based Synthesizers of Multiple Feedback and Feedforward Structures</b><br>S. Tsang and T. Ng                                                                     | <b>A57</b>  |
| <b>TUIF-64</b><br><b>1:30 PM</b> | <b>RF Circuit Design In Reliability</b><br>E. Xiao and J.S. Yuan                                                                                                                                                                                     | <b>A61</b>  |
| <b>TUIF-65</b><br><b>1:30 PM</b> | <b>Piecewise Continuous Linear Interpolation of the Sine Function for Direct Digital Frequency Synthesis</b><br>P. Langlois and D. Al-Khalili                                                                                                        | <b>A65</b>  |
| <b>TUIF-66</b><br><b>1:30 PM</b> | <b>An Integrated Wideband-IF-Receiver Architecture for Mobile Terminals</b><br>R. Richter and H-J. Jentschel                                                                                                                                         | <b>A69</b>  |
| <b>TUIF-67</b><br><b>1:30 PM</b> | <b>Multiple-Chip Module Design Optimizations Using A Novel Layout Parameterization Technique</b><br>C-W. Huang, G.S. Dow, J. Bao, S. Kuran, and J. Sercu                                                                                             | <b>A73</b>  |
| <b>TUIF-68</b><br><b>1:30 PM</b> | <b>High-Performance Three-Dimensional On-chip Inductors in SOI CMOS Technology for Monolithic RF Circuit Applications</b><br>J. Kim, J-O. Plouchart, N. Zamdmer, N. Fong, L-H. Lu, Y. Tan, K.A. Jenkins, M. Sherony, R. Groves, M. Kumar, and A. Ray | <b>A77</b>  |
| <b>TUIF-69</b><br><b>1:30 PM</b> | <b>Non-Ideality Analysis of Clock-Jitter Suppressing Sampler for Wideband <math>\Sigma\Delta</math> Analog-to-Digital Converters</b><br>A. Strak and H. Tenhunen                                                                                     | <b>A81</b>  |
| <b>TUIF-70</b><br><b>1:30 PM</b> | <b>Symmetric 3D Passive Components for RF ICs Application</b><br>W-Z. Chen and W-H. Chen                                                                                                                                                             | <b>A85</b>  |
| <b>TUIF-71</b><br><b>1:30 PM</b> | <b>Monolithic Supply Modulated RF Power Amplifier and DC-DC Power Converter IC</b><br>S. Abedinpour, I. Deligoz, J. Desai, M. Figiel, and S. Kiaei                                                                                                   | <b>A89</b>  |
| <b>TUIF-72</b><br><b>1:30 PM</b> | <b>Toroidal Inductors for Integrated Radio Frequency and Microwave Circuits</b><br>J. Suryanarayanan, W. Liu, J. Nath, B.N. Johnson, S. Mohammadi, L. Katchi, and M. Steer                                                                           | <b>A93</b>  |
| <b>TUIF-73</b><br><b>1:30 PM</b> | <b>CMOS-Compatible RF-MEMS Tunable Capacitors</b><br>A. Oz and G. Fedder                                                                                                                                                                             | <b>A97</b>  |
| <b>TUIF-74</b><br><b>1:30 PM</b> | <b>The Performance Comparison of CMOS Vs Bipolar VCO In SiGe BiCMOS technology</b><br>D. Wang and X. Wang                                                                                                                                            | <b>A101</b> |
| <b>TUIF-75</b><br><b>1:30 PM</b> | <b>A High Isolation CMFB Downconversion Micromixer Using 0.18-<math>\mu</math>m Deep N-well CMOS Technology</b><br>C. Meng, S. Xu, T-H. Wu, M. Chao, and G. Huang                                                                                    | <b>A105</b> |
| <b>TUIF-76</b><br><b>1:30 PM</b> | <b>The Design of 5 GHz Voltage Controlled Ring Oscillator Using Source Capacitively Coupled Current Amplifier</b><br>R. Tao and M. Berroth                                                                                                           | <b>A109</b> |
| <b>TUIF-77</b><br><b>1:30 PM</b> | <b>Reducing Phase Noise by Proper Sizing of MOSFETs in LC Tuned VCOs</b><br>Y-M. Li and J. Connelly                                                                                                                                                  | <b>A113</b> |
| <b>TUIF-79</b><br><b>1:30 PM</b> | <b>Single-ended Differential Amplifier and Mixer Circuits Utilizing Complementary RF Characteristics of both NMOS and PMOS</b><br>I. Nam, B. Kim, and K. Lee                                                                                         | <b>A117</b> |
| <b>TUIF-80</b><br><b>1:30 PM</b> | <b>A Widlar-Bandgap based Intermediate-Frequency Voltage-Controlled Oscillator for GSM/DCS Transceiver ICs</b><br>A. Dec, K. Suyama, Y. Kimura, and T. Ichinose                                                                                      | <b>A121</b> |

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| <b>TUIF-81</b><br><b>1:30 PM</b>  | <b>A 110MHz 84dB CMOS Programmable Gain Amplifier with RSSI</b><br>C-P. Wu and H-W. Tsao                                                                                                    | <b>A125</b> |
| <b>TUIF-82</b><br><b>1:30 PM</b>  | <b>BPSK to ASK Converter for RF Digital Communications</b><br>J. Lopez-Villegas, J. Macias, J. Cabanillas, J. Sieiro, J. Osorio, J. Samitier, J. Bausells, J. Montserrat, and E. Cabruja    | <b>A129</b> |
| <b>TUIF-83</b><br><b>1:30 PM</b>  | <b>A 5.3 GHz Phase Shift Tuned I/Q LC Oscillator with 1.1 GHz Tuning Range</b><br>J. van der Tang and A. van Roermund                                                                       | <b>A133</b> |
| <b>TUIF-84</b><br><b>1:30 PM</b>  | <b>A Multilayer Active Hybrid-Ring Using Ground-Slot Coupling Technique</b><br>S. Hui, B-L. Ooi, M. Leong, and P. Kooi                                                                      | <b>A137</b> |
| <b>TUIF-85</b><br><b>1:30 PM</b>  | <b>A Packaged 2.3 GHz SiGe VCO with Parallel-Branch Inductors</b><br>J-Y. Lee, D. Suh, S-H. Lee, S-Y. Lee, C-W. Park, S. Kim, K-H. Shim, J-Y. Kang, K-I. Cho, and S.H. Oh                   | <b>A141</b> |
| <b>TUIF-86</b><br><b>1:30 PM</b>  | <b>A Low Power Wideband 2.6GHz CMOS Injection-Locked Ring Oscillator Prescaler</b><br>R. Dehghani and S. Atarodi                                                                            | <b>A145</b> |
| <b>TUIF-87</b><br><b>1:30 PM</b>  | <b>Gate Oxide Breakdown on Low Noise and Power Amplifier Performance</b><br>H. Yang, W. Smith, and J. Yuan                                                                                  | <b>A149</b> |
| <b>TUIF-88</b><br><b>1:30 PM</b>  | <b>A Fully Integrated, Single-Chip Handset Power Amplifier in SiGe BiCMOS for W-CDMA Applications</b><br>I.A. Rippke, J. Duster, and K. Kornegay                                            | <b>A153</b> |
| <b>TUIF-89</b><br><b>1:30 PM</b>  | <b>Ku-Band Low Noise Amplifier with Using Short-Stub ESD Protection</b><br>C-K. Park, M-G. Kim, C-H. Kim, and S. Hong                                                                       | <b>A157</b> |
| <b>TUIF-90</b><br><b>1:30 PM</b>  | <b>A SiGe Active Sub-Harmonic Front-End for 5-6 GHz Direct-Conversion Receiver Applications</b><br>R. Svitek and S. Raman                                                                   | <b>A161</b> |
| <b>TUIF-91</b><br><b>1:30 PM</b>  | <b>High-Speed, Spurious-Free Sequential Phase Frequency Detector and Dual-Modulus Prescalers for RF Frequency Synthesis</b><br>M.C. Sie, G. Cibiel, E. Tournier, R. Plana, and J. Graffeuil | <b>A165</b> |
| <b>TUIF-92</b><br><b>1:30 PM</b>  | <b>5-6 GHz SiGe VCO With Tunable Polyphase Output for Analog Image Rejection and IQ Mismatch Compensation</b><br>D.I. Sanderson and S. Raman                                                | <b>A169</b> |
| <b>TUIF-93</b><br><b>1:30 PM</b>  | <b>A High Power DPD MMIC Switch for Broadband Wireless Applications</b><br>Z. Gu, D. Johnson, S. Belletete, and D. Fryklund                                                                 | <b>A173</b> |
| <b>TUIF-94</b><br><b>1:30 PM</b>  | <b>Single-Ended Amplifier that Substantially Improves PAE and Ultra-Broadband Performance</b><br>B.S. Virdee and A.S. Virdee                                                                | <b>A177</b> |
| <b>TUIF-95</b><br><b>1:30 PM</b>  | <b>A Pseudo-Concurrent 0.18um Multi-Band CMOS LNA</b><br>S. Miri Lavasani, B. Chaudhuri, and S. Kiaei                                                                                       | <b>A181</b> |
| <b>TUIF-96</b><br><b>1:30 PM</b>  | <b>A Novel IP3 Boosting Technique Using Feedforward Distortion Cancellation Method for 5GHz CMOS LNA</b><br>M. Lin, Y. Li, and H. Chen                                                      | <b>A185</b> |
| <b>TUIF-97</b><br><b>1:30 PM</b>  | <b>Advanced Design of Broadband Distributed Amplifier using a SiGe BiCMOS Technology</b><br>G-A. Lee, H. Ko, and F. De Flaviis                                                              | <b>A189</b> |
| <b>TUIF-98</b><br><b>1:30 PM</b>  | <b>Cancellation of third order Intermodulation currents in a two-stages amplifier topology</b><br>S. Dardenne, C. Duvanaud, F. Robin, F. Huin, J-M. Paillot, and R. Allam                   | <b>A193</b> |
| <b>TUIF-99</b><br><b>1:30 PM</b>  | <b>Neutralized Differential Amplifiers using Mixed Mode s-parameters</b><br>B. Stengel and B. Thompson                                                                                      | <b>A197</b> |
| <b>TUIF-100</b><br><b>1:30 PM</b> | <b>Accurate Power Control Technique for Handset PA Modules with Integrated Directional Couplers</b><br>J. Madic, P. Bretchko, S. Zhang, R. Shumovich, and R. McMorro                        | <b>A201</b> |
| <b>TUIF-101</b><br><b>1:30 PM</b> | <b>A Fully Integrated 5.2 GHz GaInP/GaAs HBT Upconversion Micromixer with Output LC Current Combiner and Oscillator</b><br>C. Meng, S. Hsu, A. Peng, S. Wen, and G. Huang                   | <b>A205</b> |