

# RADECS

## Technical program

### Monday

- 8:15 **RADGROUND opening**
- 8:25 **Short course introduction**  
*Chairs: R. D. Schrimpf<sup>1</sup> and F. Saigné<sup>2</sup>*  
<sup>1</sup> Vanderbilt University, <sup>2</sup> University of Montpellier - IES
- 8:30 **The terrestrial environment (effects of cosmic rays and alpha particles)**  
*R. Baumann* TEXAS Instrument
- 9:15 **Real Time Test**  
*J.L. Autran* Aix-Marseille University - IM2NP
- 9:45 **Accelerated testing (ion/neutron beams, alpha foils, laser, ...)**  
*N. Seifert* INTEL
- 10:15 *RADGROUND COFFEE BREAK*
- 10:45 **Simulation tools for prediction**  
*R. Weller and R. Reed* Vanderbilt University
- 11:30 **Power (SEB, SEGR, SEL)**  
*A.D. Touboul* University of Montpellier - IES
- 12:00 **Radiation effects in medical electronics**  
*J. Wilkinson* Medtronic
- 12:30 *RADGROUND LUNCH*
- 14:00 **RADGROUND Round Table**  
*Chairs: R. Baumann<sup>1</sup> and C. Slayman<sup>2</sup>*  
<sup>1</sup> Texas Instrument, <sup>2</sup> CISCO Systems
- 16:00 *RADGROUND BREAK*
- Session RG – Radiation Effects at Ground Level**
- 16:30 **Session Introduction**  
*Chairs: L. Dilillo<sup>1</sup> and D. Truyen<sup>2</sup>*  
<sup>1</sup> University of Montpellier - LIRMM, <sup>2</sup> ATMEL
- RG-1 Proton Flux Anisotropy in the Atmosphere: Experiment and Modeling**
- 16:35 *F. Wrobel<sup>1</sup>, J.R. Vaillé<sup>1,2</sup>, D. Pantel<sup>1</sup>, L. Dilillo<sup>3</sup>, J.M. Gallière<sup>1</sup>, A.D. Touboul<sup>1</sup>, P. Chadoutaud<sup>4</sup>, P. Cocquerez<sup>4</sup>, M. Lacourty<sup>4</sup>, M.A. Clair<sup>4</sup>, J.L. Autran<sup>5</sup>, C. Chatry<sup>6</sup>, F. Laplanche<sup>7</sup>, B. Azais<sup>7</sup>, F. Saigné<sup>1</sup>*  
<sup>1</sup> University of Montpellier - IES, <sup>2</sup> University of Nîmes, <sup>3</sup> University of Montpellier - LIRMM, <sup>4</sup> CNES, <sup>5</sup> Aix-Marseille University - IM2NP, <sup>6</sup> TRAD, <sup>7</sup> DGA
- RG-2 Neutrons-induced IGBT Failure: Effects of the Number of Tested Devices on the Cross Section Calculation**
- 16:50 *A.D. Touboul, L.L. Foro, F. Wrobel, K. Guetarni, J. Boch, F. Saigné*  
University of Montpellier - IES

# Tuesday

- 9:00 **Opening Remarks and official talks**  
*P. Fouillat, General Chair*  
University of Bordeaux - IMS
- 9:20 **Technical session opening remarks**  
*R. Velazco, Technical Chair CNRS TIMA-Labs*

## Session A – Space and Terrestrial Environments

- 9:30 **Session Introduction**  
*Chairs: E. Daly<sup>1</sup> and G. Rolland<sup>2</sup>*  
<sup>1</sup> ESA-ESTEC, <sup>2</sup> CNES
- A-1 Jovian Radiation Belt Models, Uncertainties and Margins**  
9:35 *H. Evans, E. Daly, P. Nieminen, C. Erd* ESA-ESTEC
- A-2 Outer electron belt nowcast with an advanced data assimilation tool**  
9:50 *S. Bourdarie<sup>1</sup>, V. Maget<sup>1</sup>, A. Sicard-Piet<sup>1</sup>, G. Rolland<sup>2</sup>*  
<sup>1</sup> ONERA-DESP, <sup>2</sup> CNES
- A-3 Characterizing solar energetic particles access to any Earth-space location**  
10:05 *V. Maget<sup>1</sup>, S. Bourdarie<sup>1</sup>, G. Rolland<sup>2</sup>*  
<sup>1</sup> ONERA-DESP, <sup>2</sup> CNES
- A-4 Characterization of the neutron environment at the CERN-EU High Energy Reference Field and at the Pic du Midi**  
10:20 *A. Cheminet<sup>1</sup>, G. Hubert<sup>1</sup>, V. Lacoste<sup>2</sup>, R. Velazco<sup>3</sup>, D. Boscher<sup>1</sup>*  
<sup>1</sup> ONERA-DESP, <sup>2</sup> IRSN, <sup>3</sup> TIMA
- 10:35 *BREAK*
- 11:05 **INVITED TALK : Radiation Testing and Modeling: Practical Challenges and Shortfalls for the Next Five Years**  
*K. LaBel*  
NASA Goddard Space Flight Center

12:05 *LUNCH*

## Session B – Facilities and Dosimetry

- 14:00 **Session Introduction**  
*Chairs: G. Berger<sup>1</sup> and B. Piquet<sup>2</sup>*  
<sup>1</sup> UCL, <sup>2</sup> University of Montpellier - IES
- B-1 Mixed Particle Field Influence on RadFET sensitivities**  
14:05 *J. Mekki, M. Brugger, S. Danzeca, K. Roed, G. Spiezia* CERN
- B-2 Radiation Effects on the Photoluminescence of Rare-earth Doped Pyrochloric Powders**  
14:20 *S.L. Weeden-Wright, S.L. Gollub, R. Harl, A.B. Hmelo, D.M. Fleetwood, B. Rogers, R.D. Schrimpf, D.G. Walker*  
Vanderbilt University
- B-3 Development of a CMOS Oscillator Concept for Particle Detection and Tracking**  
14:35 *K. Castellani-Coulié, H. Aziza, W. Rahajandraibe, G. Micolau, J.M. Portal*  
Aix-Marseille University – IM2NP

## Session C – Basic Mechanisms of Radiation Effects

- 14:50 **Session Introduction**  
*Chairs: A. Paccagnella<sup>1</sup> and A.D. Toubouf<sup>2</sup>*  
<sup>1</sup> University of Padova, <sup>2</sup> University of Montpellier - IES
- C-1 SEU Measurements and Simulations in a Mixed Field Environment**  
14:55 *R. García Alía<sup>1</sup>, B. Biskup<sup>1</sup>, M. Brugger<sup>1</sup>, M. Calviani<sup>1</sup>, C. Poivey<sup>2</sup>, K. Røed<sup>1</sup>, F. Saigné<sup>3</sup>, G. Spiezia<sup>1</sup>, F. Wrobel<sup>3</sup>*  
<sup>1</sup> CERN, <sup>2</sup> ESA-ESTEC, <sup>3</sup> University of Montpellier – IES

- C-2 Simulation of Radiation Effects in GaAs Solar Cells–Physics Based Models versus Experimental Data**  
 15:10 *M. Turowski<sup>1</sup>, T. Bald<sup>1</sup>, A. Raman<sup>1</sup>, A. Fedoseyev<sup>1</sup>, J.H. Warner<sup>2</sup>, C.D. Cress<sup>2</sup>, R.J. Walters<sup>2</sup>*  
<sup>1</sup> CFD Research Corporation, <sup>2</sup> NRL
- C-3 Modeling the Effect of Hysteresis on Aligned Nanotube FETs exposed to ionizing radiation**  
 15:25 *I.S. Esqueda<sup>1</sup>, Y. Fu<sup>1</sup>, C.D. Cress<sup>2</sup>, J. Zhang<sup>1</sup>, C. Zhou<sup>1</sup>, J. Ahlbin<sup>1</sup>, M. Bajura<sup>1</sup>, G. Boverman<sup>1</sup>, M. Fritze<sup>1</sup>*  
<sup>1</sup> University of Southern California, <sup>2</sup> NRL
- C-4 Accurate Model of Surface Recombination for Radiation-Induced Excess Base Current in Bipolar Junction Transistors**  
 15:40 *A.M. Campola<sup>1</sup>, H.J. Barnaby<sup>2</sup>, B. Vermeire<sup>3</sup>*  
<sup>1</sup> NASA, <sup>2</sup> Arizona State University, <sup>3</sup> Space Micro
- 15:55 **Data Workshop Introduction**  
*Chairs: N. Chatry<sup>1</sup> and B. Glass<sup>2</sup>* <sup>1</sup> TRAD, <sup>2</sup> ESA-ESTEC
- 16:00 to 18:00 **Data Workshop – Poster papers**
- 18:00 **WELCOME COCKTAIL**

## Wednesday

### Session D – Photonic Devices and ICs

- 9:00 **Session Introduction**  
*Chairs: V. Goiffon<sup>1</sup> and S. Girard<sup>2</sup>*  
<sup>1</sup> ISAE, University of Toulouse, <sup>2</sup> CEA DAM
- D-1 Proton irradiation effects on InGaAs/InP Photodiodes for Space Applications**  
 9:05 *G. Pedroza<sup>1</sup>, M. Bouillier<sup>2</sup>, L. Sun How<sup>3</sup>, L. Bechou<sup>4</sup>, T. Nuns<sup>5</sup>, P. Arnolda<sup>5</sup>, Y. Ousten<sup>4</sup>, J.L. Goudard<sup>6</sup>*  
<sup>1</sup> ALPhANOV, <sup>2</sup> CNES, <sup>3</sup> AdvEOTec, <sup>4</sup> University of Bordeaux - IMS, <sup>5</sup> ONERA-DESP, <sup>6</sup> 3S-PHOTONICS
- D-2 Monte Carlo based DSNU prediction after proton irradiation**  
 9:20 *C. Inguibert<sup>1</sup>, T. Nuns<sup>1</sup>, E. Martin<sup>1,2</sup>, D. Falguère<sup>1</sup>, O. Gilard<sup>2</sup>*  
<sup>1</sup> ONERA-DESP, <sup>2</sup> CNES
- D-3 Single Event Effects in CMOS Image Sensors**  
 9:35 *V. Lалуcaa<sup>1</sup>, V. Goiffon<sup>1</sup>, G. Rolland<sup>2</sup>, S. Petit<sup>2</sup>, P. Magnan<sup>1</sup>*  
<sup>1</sup> ISAE, University of Toulouse, <sup>2</sup> CNES
- D-4 Proton and  $\gamma$ -rays Irradiation Induced Dark Current Random Telegraph Signal in a 0.18 $\mu$ m CMOS Image Sensor**  
 9:50 *E. Martin<sup>1,2</sup>, J.P. David<sup>1</sup>, C. Virmontois<sup>2</sup>, T. Nuns<sup>1</sup>, O. Gilard<sup>2</sup>*  
<sup>1</sup> ONERA-DESP, <sup>2</sup> CNES
- D-5 Comparison of gamma-radiation induced absorption of Al-doped, P-doped and Ge-doped fibres**  
 10:05 *A. V. Faustov<sup>1, 2</sup>, A. Gusarov<sup>1</sup>, M. Wuilpart<sup>3</sup>, A.A. Fotiadis<sup>3,4,5</sup>, L.B. Liokumovich<sup>2</sup>, O.I. Koto<sup>2</sup>, A. L. Tomashuk<sup>5,6</sup>, T. Deschoutte<sup>7</sup>, P. Mégret<sup>3</sup>*  
<sup>1</sup> SCK•CEN, <sup>2</sup> Saint-Petersburg State Polytechnical University, <sup>3</sup> University of Mons, <sup>4</sup> Ioffe Physical-Technical Institute, <sup>5</sup> Ulyanovsk State University, <sup>6</sup> Fibre Optic Research Center, <sup>7</sup> Laborelec
- 10:20 *BREAK*

### Session E – SEE Mechanisms and Modeling

- 10:50 **Session Introduction**  
*Chairs: S. Buchner<sup>1</sup> and F. Darracq<sup>2</sup>*  
<sup>1</sup> NRL, <sup>2</sup> University of Bordeaux - IMS
- E-1 Single Event Effect analysis on RF operated AlGaIn/GaN HEMTs**  
 10:55 *M. Rostewitz, K. Hirche, J. Lätti, E. Jutzi, J. Daeubler*  
 Tesat-Spacecom

**E-2 The Cause of Subthreshold Leakage Currents Induced by Nucleons and Ions in MOSFETs**

11:10

*A. M. Chugg<sup>1</sup>, S. Parker<sup>1</sup>, P.H. Duncan<sup>1</sup>, T.S. Barber<sup>2</sup>,  
A. Hands<sup>3</sup>, P. Morris<sup>3</sup>, C. Poivey<sup>4</sup>*

<sup>1</sup>MBDA, <sup>2</sup>University of Warwick, <sup>3</sup>QinetiQ, <sup>4</sup>ESA-ESTEC

**E-3 Soft Error Triggering Criterion Based on Simple Electrical Model of the SRAM cell**

11:25

*F. Wrobel, A.D. Touboul, F. Saigné*

University of Montpellier - IES

**E-4 Effects of Low-Energy Muons on Electronics: Physical Insights and Geant4 Simulations**

11:40

*S. Semikh<sup>1</sup>, S. Serre<sup>1</sup>, J.L. Autran<sup>1</sup>, D. Munteanu<sup>1</sup>, G. Gasio<sup>2</sup>, P. Roche<sup>2</sup>*

<sup>1</sup>Aix-Marseille University - IM2NP, <sup>2</sup>STMicroelectronics

11:55 LUNCH

**E-5 Investigation of Flip-Flop Effects in a Linear Analog Comparator-with-Hysteresis Circuit**

14:00

*N.J.H. Roche<sup>1,2</sup>, S. Buchner<sup>2</sup>, F. Roig<sup>3</sup>, L. Dusseau<sup>1</sup>, J. Warner<sup>2</sup>, J. Boch<sup>1</sup>, D. McMorro<sup>2</sup>, F. Saigné<sup>1</sup>, G. Auriel<sup>3</sup>, B. Azais<sup>4</sup>*

<sup>1</sup>University of Montpellier - IES, <sup>2</sup>NRL, <sup>3</sup>CEA, <sup>4</sup>DGA

**E-6 SEL sensitive area mapping and the effect of reflections from metal lines on laser SEE testing**

14:15

*N.A. Dodds<sup>1</sup>, N.C. Hooten<sup>1</sup>, R.A. Reed<sup>1</sup>, R.D. Schrimpf<sup>1</sup>, J.H. Warner<sup>2</sup>, N.J.H. Roche<sup>2</sup>, D. McMorro<sup>2</sup>, S. Buchner<sup>2</sup>, S. Jordan<sup>3</sup>, J.A. Pellish<sup>4</sup>, W.G. Bennett<sup>1</sup>, N.J. Gaspard<sup>1</sup>, M.P. King<sup>1</sup>*

<sup>1</sup>Vanderbilt University, <sup>2</sup>NRL, <sup>3</sup>Jazz Semiconductor, <sup>4</sup>NASA

**E-7 Trends in Heavy-ion Upset Cross-sections for Flip-flop Designs at Deep Sub-micron Bulk CMOS Technologies**

14:30

*N. Gaspard<sup>1</sup>, S. Jagannathan<sup>1</sup>, A. Sternberg<sup>1</sup>, T.D. Loveless<sup>1</sup>, S.J. Wen<sup>2</sup>, R. Wong<sup>2</sup>, B.L. Bhuv<sup>2</sup>, L.W. Massengill<sup>1</sup>, W.T. Holman<sup>1</sup>*

<sup>1</sup>Vanderbilt University, <sup>2</sup>Cisco Systems

**14:45 Poster Session Introduction**

*Chair: V. Ferlet-Cavrois*

ESA-ESTEC

14:50 to 16:50 **Poster Session**

**16:50 INVITED TALK: Plasma and Radiation Environments of Giant Planets and Their Moons**

*I. Jun, Jet Propulsion Laboratory*

**17:50 EXHIBITORS'RECEPTION**

**Thursday**

**Session F – Radiation Effects in Devices & ICs**

**9:00 Session Introduction**

*Chairs: P. Adell<sup>1</sup> and H. Barnaby<sup>2</sup>*

<sup>1</sup>JPL, <sup>2</sup>Arizona State University

**F-1 Upset Manifestations in Embedded Digital Signal Processors (DSPs) due to Single Event Effects (SEE)**

9:05

*R. Monreal<sup>1</sup>, G. Swift<sup>2</sup>*

<sup>1</sup>Southwest Research Institute, <sup>2</sup>Xilinx

**F-2 Total Ionization Dose Response of FET-based Wideband, High-Isolation RF Switch in SiGe BiCMOS Technology**

9:20

*A.S. Cardoso, P.S. Chakraborty, N.E. Lourenco, P. Song, R. Arora, T.D. England, E.W. Kenyon, J.D. Cressler*

Georgia Institute of Technology

**F-3 Modeling charge loss in DNW CMOS MAPS exposed to non-ionizing radiation**

9:35

*L. Ratti<sup>1,3</sup>, L. Gaioni<sup>3</sup>, G. Traversi<sup>2,3</sup>, S. Zucca<sup>1,3</sup>, S. Bettarini<sup>3,4</sup>, F. Morsani<sup>3</sup>, G. Rizzo<sup>4,3</sup>, L. Bosisio<sup>5,3</sup>, I. Rashevskaya<sup>5,3</sup>*

<sup>1</sup>Univ. degli Studi di Pavia, <sup>2</sup>Univ. degli Studi di Bergamo, <sup>3</sup>Istituto Nazionale di Fisica Nucleare, <sup>4</sup>Univ. degli Studi di Pisa, <sup>5</sup>Univ. degli Studi di Trieste

**F-4 Improving the Protons Radiation-Robustness of Integrated Circuits By Using The Diamond Layout Style**

9:50

*S. Pinillos Gimenez, D. Manha Alati, M. Aparecida Guazelli da Silveira, L.E. Seixas Junior, W. Romeiro de Mello, N. Added, N. Medina, M. Harri Tabacniks*  
FEI University Center and University of Sao Paulo

10:05 *BREAK*

**F-5 Impact of SOI Substrate on the Radiation Response of Ultra-Thin Transistors towards the 20 nm node**

10:35

*M. Gaillardin<sup>1</sup>, M. Martinez<sup>1</sup>, P. Paillet<sup>1</sup>, F. Andrieu<sup>1</sup>, S. Girard<sup>1</sup>, M. Raine<sup>1</sup>, C. Marcandella<sup>1</sup>, O. Duhamel<sup>1</sup>, N. Richard<sup>2</sup>, O. Faynot<sup>2</sup>*  
<sup>1</sup> CEA DAM, <sup>2</sup> CEA LETI

**F-6 Investigations on the Vulnerability of Advanced CMOS Technologies to MGy Dose Environments**

10:50

*M. Gaillardin<sup>1</sup>, S. Girard<sup>1</sup>, P. Paillet<sup>1</sup>, J.L. Leray<sup>2</sup>, V. Goiffon<sup>3</sup>, P. Magnan<sup>3</sup>*  
<sup>1</sup> CEA DAM, <sup>2</sup> CEA Saclay/CabHC, <sup>3</sup> University of Toulouse - ISAE

**F-7 Total Dose Effects in Aligned Carbon Nanotube Transistors with Al<sub>2</sub>O<sub>3</sub> Gate Dielectrics**

11:05

*J.R. Ahlbin<sup>1</sup>, I.S. Esqueda<sup>1</sup>, C.D. Cress<sup>2</sup>, P.J. McMarr<sup>2</sup>, H.L. Hughes<sup>2</sup>, Y. Fu<sup>1</sup>, J. Zhang<sup>1</sup>, C. Wang<sup>1</sup>, C. Zhou<sup>1</sup>, M. Bajura<sup>1</sup>, G. Boverman<sup>1</sup>, M. Fritze<sup>1</sup>*  
<sup>1</sup> University of Southern California, Information Sciences Institute, <sup>2</sup> NRL

**F-8 New Testing Methodology of an Analog to Digital Converter for the LHC mixed radiation field**

11:20

*S. Danzeca<sup>1</sup>, L. Dusseau<sup>1</sup>, P. Peronnard<sup>1</sup>, G. Spiezia<sup>2</sup>*  
<sup>1</sup> CERN, <sup>2</sup> University of Montpellier – IES

11:35 **INVITED TALK**

12:35 *LUNCH*

**Session G – SEE Transient Characterization**

**14:20 Session Introduction**

*Chairs: F. Bezerra<sup>1</sup> and F. Miller<sup>2</sup>* CNES, <sup>2</sup> EADS

**G-1 Angular Dependence of Double-Pulse-Single-Event Transients in Bulk CMOS**

14:25

*J.R. Ahlbin<sup>1</sup>, N. Atkinson<sup>2</sup>, M.J. Gadlage<sup>3</sup>, D.R. Ball<sup>4</sup>, B.L. Bhuvu<sup>2</sup>, L.W. Massengill<sup>4</sup>*  
<sup>1</sup> University of Southern California – ISI, <sup>2</sup> Vanderbilt University, <sup>3</sup> NAVSEA Crane, <sup>4</sup> Vanderbilt University – ISDE

**G-2 Impact of NBTI-Induced Pulse-Width Modulation on SET Pulse-Width Measurement**

14:40

*R. Harada<sup>1</sup>, Y. Mitsuyama<sup>2</sup>, M. Hashimoto<sup>1</sup>, T. Onoye<sup>1</sup>*  
<sup>1</sup> Osaka University, <sup>2</sup> Kochi University of Technology

**G-3 Negative Bias Temperature Instability Effect on the Single Event Transient Sensitivity of a 65nm CMOS Technology**

14:55

*I. El Moukhtari<sup>1</sup>, V. Pouget<sup>1</sup>, F. Darracq<sup>1</sup>, C. Larue<sup>1</sup>, P. Perdu<sup>2</sup>, D. Lewis<sup>1</sup>*  
<sup>1</sup> University of Bordeaux - IMS, <sup>2</sup> CNES

**G-4 SET Characterization of two 90-nm Voltage Controlled Delay Line Topologies**

15:10

*P. Maillard<sup>1</sup>, L.W. Massengill<sup>1</sup>, W.T. Holman<sup>1</sup>, T.D. Loveless<sup>1</sup>, Y. Chen<sup>1</sup>, N. Roche<sup>2</sup>, J. Warner<sup>2</sup>, S. Buchner<sup>2</sup>, D. McMorrow<sup>2</sup>*  
<sup>1</sup> Vanderbilt University, <sup>2</sup> NRL

**Session H – SEE Devices and Integrated Circuits**

**15:25 Session Introduction**

*Chairs: F. Kastensmidt<sup>1</sup> and D. Alexandrescu<sup>2</sup>*

<sup>1</sup> Federal University of Rio Grande do Sul, <sup>2</sup> IROC

**H-1 Single and Multiple Cell Upsets in 25-nm NAND Flash Memories**

15:30

*M. Bagatin<sup>1,2</sup>, S. Gerardin<sup>1</sup>, A. Paccagnella<sup>1,2</sup>, V. Ferlet-Cavrois<sup>3</sup>*  
<sup>1</sup> University of Padova, <sup>2</sup> Istituto Nazionale di Fisica Nucleare, <sup>3</sup> ESA-ESTEC

**H-2 Flight Experience of the Xilinx Virtex-4**

15:45

*H. Quinn, P. Graham, K. Morgan, Z. Baker, M. Caffrey, D. Smith, R. Bell, M. Wirthlin* Los Alamos National Laboratory

- H-3 SETA: A New Analytical Tool for Single Event Transient Analysis on Flash-based FPGAs**  
16:00 *L. Sterpone<sup>1</sup>, V. Ferlet Cavrois<sup>2</sup>, D. Merodio Codinachs<sup>2</sup>, C. Poivey<sup>2</sup>*  
<sup>1</sup> Politecnico di Torino, <sup>2</sup> ESA-ESTEC
- H-4 An Experimental Technique to Calculate the Temporal Masking Factor**  
16:15 *N.N. Mahatme<sup>1</sup>, S. Jagannathan<sup>1</sup>, T. Assis<sup>1</sup>, T.D. Loveless<sup>1</sup>, B.L. Bhuvu<sup>1</sup>, L.W. Massengill<sup>1</sup>, S.J. Wen<sup>2</sup>, R. Wong<sup>2</sup>*  
<sup>1</sup> Vanderbilt University, <sup>2</sup> CISCO Systems
- H-5 Characterizing the Effects of Single Event Upsets on Synchronous Data Paths**  
16:30 *M. Berg, M. Friendlich, H. Kim, C. Seidlick, K. LaBel, R. Ladbury, J. Pellish*  
NASA GSFC
- 16h45 *BREAK*
- 18:30 **DEPARTURE BY BUS TO RADECS RECEPTION (ARCANGUES)**

## Friday

### Session I – Hardening by Design

- 9:00 **Session Introduction**  
*Chairs: L. Entrena<sup>1</sup> and D. Hansen<sup>2</sup>*  
<sup>1</sup> University Carlos III of Madrid, <sup>2</sup> Maxwell
- I-1 A 65 nm Low-Power Adaptive-Coupling Redundant Flip-Flops**  
9:05 *M. Masuda<sup>1</sup>, K. Kubota<sup>1</sup>, R. Yamamoto<sup>1</sup>, J. Furuta<sup>2</sup>, K. Kobayashi<sup>1, 3</sup>, H. Onodera<sup>2, 3</sup>*  
<sup>1</sup> Kyoto Institute of Technology, <sup>2</sup> Kyoto University, <sup>3</sup> JST, CREST
- I-2 A hybrid technique for soft error mitigation in interrupt-driven applications**  
9:20 *A. Martínez-Álvarez<sup>1</sup>, F. Restrepo-Calle<sup>2</sup>, S. Cuenca-Asensi<sup>1</sup>, L. M. Reineri<sup>3</sup>, A. Lindoso<sup>4</sup>, L. Entrena<sup>4</sup>*  
<sup>1</sup> University of Alicante, <sup>2</sup> University of Seville, <sup>3</sup> Politecnico di Torino, <sup>4</sup> University Carlos III of Madrid
- I-3 Using Configurable SET Temporal Filtering to reduce Soft Error Rate**  
9:35 *J.E. Souza, F. Lima Kastensmidt, F. Almeida, E. Chielle,*  
Federal University of Rio Grande do Sul
- I-4 RHBD Technique for Single-Event Charge Cancellation in Folded-Cascode Amplifiers**  
9:50 *N.M. Atkinson<sup>1</sup>, R.W. Blaine<sup>1</sup>, J.S. Kauppila<sup>1</sup>, S.E. Armstrong<sup>2</sup>, T.D. Loveless<sup>1</sup>, N.C. Hooten<sup>1</sup>, W.T. Holman<sup>1</sup>, L.W. Massengill<sup>1</sup>, J. Warner<sup>3</sup>*  
<sup>1</sup> Vanderbilt University, <sup>2</sup> NAVSEA Crane, <sup>3</sup> NRL
- 10:05 *BREAK*

### Session J – Radiation Hardness Assurance

- 10:35 **Session Introduction**  
*Chairs: S. McClure<sup>1</sup> and R. Marec<sup>2,1</sup>* JPL, <sup>2</sup> THALES Alenia Space
- J-1 Investigation of 14 MeV Neutron capabilities for SEE Radiation Hardness Evaluation**  
10:40 *F. Miller<sup>1</sup>, C. Weulersse<sup>2</sup>, N. Guibbaud<sup>1</sup>, S. Morand<sup>1</sup>, R. Gaillard<sup>3</sup>, T. Carrière<sup>4</sup>*  
<sup>1</sup> EADS Suresnes, <sup>2</sup> EADS Toulouse, <sup>3</sup> RG Consulting, <sup>4</sup> ASTRIUM ST
- J-2 Experimental Evaluation of Software Hardening Techniques for GPUs**  
10:55 *P. Rech<sup>1</sup>, C. Aguiar<sup>1</sup>, C. Frost<sup>2</sup>, L. Carro<sup>1</sup>*  
<sup>1</sup> Federal University of Rio Grande do Sul, <sup>2</sup> Rutherford Appleton Laboratories
- J-3 A Thermal Annealing Approach to Extend Metal Oxide Semiconductor Devices Lifetime Exposed to Very High Dose Levels**  
11:10 *F. Roig<sup>1,2</sup>, L. Dusseau<sup>1</sup>, J. Boch<sup>1</sup>, F. Saigné<sup>1</sup>, J.R. Vaillé<sup>1</sup>, A. Touboul<sup>1</sup>, P.C. Adell<sup>3</sup>, E. Lorfèvre<sup>4</sup>, R. Ecoffet<sup>4</sup>*  
<sup>1</sup> University of Montpellier – IES, <sup>2</sup> CEA, <sup>3</sup> JPL, <sup>4</sup> CNES
- J-4 HETA: Hybrid Error-detection Technique through Assertions**  
11:25 *J. Rodrigo Azambuja<sup>1,2</sup>, M. Altieri<sup>1</sup>, F. Lima Kastensmidt<sup>1</sup>, J. Becker<sup>2</sup>*  
<sup>1</sup> Federal University of Rio Grande do Sul, <sup>2</sup> Karlsruhe Institute of Technology
- 11:40 **Closing remarks**