

# 2009 Physical Electronics Conference Final Program

Tuesday, June 16, 2009

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5:00 – 8:00 pm Registration and Welcome Reception- Stonier Hall

Wednesday, June 17, 2009 – AM

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8:00 am Registration Van Dyck Hall, Room 211

8:00 – 8:40 Opening and Welcome Van Dyck Hall, Room 211

**Session I Van Dyck Hall, Room 211**

**Moderator:** Eric Garfunkel, *Rutgers University*

8:40 S1.1 *An STM study of atomic Co wires*  
**N. Zaki, D. Potapenko, P. D. Johnson, P. Zahl, D. Achharya, P. Sutter, and R. M. Osgood**

9:00 S1.2 *Metal film growth on alloy surfaces: Deposition of Ni & Al on NiAl(110)*  
**Dapeng Jing, Barış Ünal, Yong Han, J.W. Evans and P. Thiel**

9:20 S1.3 *Investigation of hot electron transport properties of thin copper films using ballistic electron emission microscopy*  
**John Garramone, Joseph Abel, Ilona Sitnitsky and Vincent LaBella**

9:40 S1.4 *Photo-switching of single-molecule and one-dimensional assemblies of azobenzene molecules in precise nanoscale environments*  
**Ajeet S. Kumar and Paul S. Weiss**

**10:00 – 10:20 Refreshments**

**Moderator:** Vincent LaBella, *University at Albany*

10:20 S1.5 *Properties of perfect stripe arrays on B-doped Si(100)*  
**I. Ermanoski, G. L. Kellogg and N. C. Bartelt**

10:40 S1.6 *The production of near-atomically-flat Si(100) surfaces*  
**Ankush Gupta, Ian T. Clark, Brandon S. Aldinger and Melissa A. Hines**

11:00 S1.7 *Nanopatterning of Si(111) surfaces*  
**D. J. Michalak, S. Rivillon Amy, M. Dai, D. Aureau, A. Estève, and Y. J. Chabal**

(Continued on next page)

- 11:20 S1.8 *The reduction kinetics of graphene oxide determined by temperature programmed desorption*  
**Carl A. Ventrice, Jr, Daniel A. Field, Nicholas J. Clark, Heike Geisle, Inhwa Jung, Dongxing Yang, Richard Piner, and Rodney S. Ruoff**
- 11:40 S1.9 *Polar nano region study of relaxor ferroelectrics in  $\text{PbMg}_{1/4}\text{Ti}_{1/4}\text{Nb}_{1/2}\text{O}_3$  with computational dynamic pair distribution function*  
**H. Takenaka, I. Grinberg and A.M. Rappe**

**12:00 - 1:20                      Lunch Break                      Brower Commons**

**Wednesday, June 17, 2009 – PM**

**Session II                      Van Dyck Hall, Room 211**

**Moderator:**                      *Carol Hirschmugl, University of Wisconsin - Milwaukee*

1:20                      ***Invited Presentation:*** *Changing dielectrics into multiferroics- Alchemy enabled by strain*  
**Darrell G. Schlom**  
*Department of Materials Science and Engineering, Cornell University*

2:00 S2.1                      *Microscopic evidence of strain-induced ferromagnetic state in  $\text{LaCoO}_3$  films*  
**Soonyong Park, P. Ryan, E. Karapetrova, J. W. Kim, J. X. Ma, J. Shi, J. W. Freeland and Weida Wu**

2:20 S2.2                      *Polarization-dependent electron tunneling into ferroelectric surfaces*  
**Peter Maksymovych, Stephen Jesse, Pu Yu, Ramamoorthy Ramesh, Arthur P. Baddorf, and Sergei V. Kalinin**

2:40 S2.3                      *Surface geometric and electronic structure of  $\text{BaFe}_2\text{As}_2(001)$*   
**V.B. Nascimento, Ang Li, Dilushan R. Jayasundara, Yi Xuan, Jared O'Neal, Shuheng H. Pan, T. Y. Chien, Biao Hu, X.B. He, Guorong Li, A. S. Sefat, M. A. McGuire, B. C. Sales, D. Mandrus, M.H. Pan, Jiandi Zhang, R. Jin, and E.W. Plummer**

**3:00 – 3:20                      Refreshments**

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Session II (continued)

Van Dyck Hall, Room 211

Moderator:

Leonard C. Feldman, *Rutgers University*

3:20 S2.4

*Hydroxyl termination of HF-etched silicon carbide surfaces with unexpected stability*

**S. Dhar, S. Choi, M.D. Halls, O. Seitz, Y.J. Chabal and L.C. Feldman**

3:40 S2.5

*Local ordering of water on anatase TiO<sub>2</sub>(101)*

**Ulrike Diebold, Yunbin He, Olga Dulub, Antonio Tilocca, and Annabella Selloni**

4:00 S2.6

*Energy level alignment of zinc tetraphenylporphyrins derivatives adsorbed on wide band gap semiconductor oxides*

**S. Rangan, S. Katalinic, R. Thorpe, R. A. Bartynski, J. Rochford and E. Galoppini**

4:20 S2.7

*STM/S study of stereospecific oligomer formation on cobalt oxide*

**D. Eom, K. T. Rim, H. Zhou, L. Liu, M. Lefenfeld, C. Nuckolls, T. F. Heinz, and G. W. Flynn**

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**4:40 – 6:30**

**Session III: Posters**

**Stonier Hall – Common Room**

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**6:30 – 8:30**

**BBQ Picnic**

**Rutgers Gardens**

**Buses depart Stonier Hall at 6:15 pm**

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**8:30 – 10:30**

**Session III: Posters**

**Stonier Hall – Common Room**

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Thursday, June 18, 2009 –AM

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Session IV- Van Dyck Hall, Rm 211      Nottingham Competition

**Moderator:**            **Carl Ventrice, Jr.,** *Texas State University*

8:40    N.1            *Energy level alignment of aromatic molecules on Si(111)7x7 surfaces*  
**Conan Weiland\*** and **Robert Opila**

9:00    N.2            *Electronic energy level alignment of metal/oxide/semiconductor and organic dye/oxide systems*  
**Eric Bersch\*** and **R. A. Bartynski**

9:20    N.3            *Band alignment in checkerboard molecular semiconductor*  
**Wei Jin\*** and **J. Reutt-Robey**

9:40    N.4            *Insulator to semi-metal transition in graphene oxide*  
**Goki Eda\*** and **M. Chhowalla**

10:00   N.5            *A Moiré makes the difference: properties and applications of the morié of graphene on Ir(111)*  
**Alpha T. N'Diaye\*** and **Thomas Michely**

**10:20 – 10:40      Refreshments**

**Moderator:**            **Ulrike Diebold,** *Tulane University*

10:40   N.6            *Understanding the O-polar ZnO-(000-1)-( $\sqrt{3}\times\sqrt{3}$ )R30° reconstruction*  
**Seth King\*** and **P.F. Lyman**

11:00   N.7            *Charge trap states on colloidal nanocrystals*  
**Marissa R. Hummon\*** and **V. Narayanamurti**

11:20   N.8            *Magnetic properties of ZnO nanoparticles*  
**Adrian Quesada\*** and **Miguel Angel Garcia**

11:40   N.9            *Characterization of noble metal core shell nanostructures via scanning probe microscopy and first principles studies*  
**Aniketa Shinde\*** and **R. Ragan**

12:00   N.10            *Cr-doped Ga<sub>2</sub>Se<sub>3</sub> as a candidate dilute magnetic semiconductor*  
**Esmeralda Yitamben\*** and **M.A. Olmstead**

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**12:20 – 1:40                      Lunch Break                      Brower Commons**

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\* Denotes competitor for Nottingham Prize

Thursday, June 18, 2009 –PM

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Session IV- Van Dyck Hall, Rm 211

Nottingham Competition (continued)

**Moderator:** **Richard Kurtz**, *Louisiana State University*

1:40 ***Invited Presentation: A theory of doping in semiconductor nanocrystals***  
**Steve Erwin**

**Center for Computational Materials Science, Naval Research Laboratory**

2:20 N.11 *Anisotropic electron-phonon coupling on a two-dimensional isotropic Fermi contour:  $\bar{\Gamma}$  surface state of Be(0001)*

**TeYu Chien\* and E. W. Plummer**

2:40 N.12 *The electronic band structure of highly spin polarized CoS<sub>2</sub>*

**Ning Wu and P.A.Dowben**

3:00 N.13 *Synchrotron based depth-resolved photoemission spectroscopy from volatile aqueous surfaces*

**Matthew A. Brown\* and John C. Hemminger**

3:20 N.14 *Optical spectroscopy and microscopy at the ultimate spatial limit*

**Chi Chen\* and Wilson Ho**

**3:40 – 4:00 Refreshments**

**Moderator:** **Phil Batson**, *IBM T.J. Watson Research Center*

4:00 N.15 *Identifying molecules on semiconductor surfaces using simulated scanning tunneling microscope images*

**Liu Yang\* and Doug Doren**

4:20 N.16 *How stable and tunable are organic layers grafted on Silicon?*

**Damien Aureau\* and J.-N. Chazaviel**

4:40 N.17 *Measurement of charge transfer through single molecules*

**Yangjun Xing\* and Eric Borguet**

5:00 N.18 *Surface chemistry of NCO and NCN species adsorbed on Cu(001)*

**Erkan Z.Ciftlikli\* and B. J. Hinch**

5:20 N.19 *Controlling the bond scission sequence of methanol decomposition on Pt-Modified tungsten carbide*

**Alan L. Stottlemeyer\* and Jingguang G. Chen**

5:40 N.20 *Adsorbate interactions with organic ferroelectric polymers*

**Jie Xiao\* and Peter A. Dowben**

\* Denotes competitor for Nottingham prize

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**6:00 - 7:00**

**Break**

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**7:00 – 9:00**

**Conference Banquet  
& Awards Presentation**

**Steakhouse 85  
85 Church St., New Brunswick, NJ**

Friday, June 19, 2009 –AM

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Session V

Van Dyck Hall, Rm 211

Moderator: Bruce Koel, *Lehigh University*

- 8:40 S5.1 *Band alignment at high- $\kappa$ /III-V interfaces grown by atomic layer deposition*  
**Alan S. Wan, Daniel Mastrogiovanni, Lei Yu, Hang Dong Lee, Tian Feng, Eric Garfunkel, and Torgny Gustafsson**
- 9:00 S5.2 *Understanding and enhancing the nucleation of palladium atomic layer deposition*  
**D.N. Goldstein and S.M. George**
- 9:20 S5.3 *First-principles study of the atomic and electronic structure of  $Fe_2O_3(0001)/MgO(111)$  interfaces*  
**K. Pande, M. Gajdardziska-Josifovska and M. Weinert**
- 9:40 S5.4 *Reduction of native oxides on GaAs during atomic layer deposition of  $Al_2O_3$*   
**Hang Dong Lee, Tian Feng, Lei Yu, Daniel Mastrogiovanni, Alan Wan, Torgny Gustafsson and Eric Garfunkel**
- 10:00 S5.5 *Ultrafast vibrational dynamics of interfacial water*  
**Ali Eftekhari-Bafrooei and Eric Borguet**
- 10:20 S5.6 *Looking for stability: The role of hydrogen on the  $ZnO(000-1)-(1 \times 1)$  surface*  
**S.E. Chamberlin, H.C. Poon, S.T. King, M. Weinert, P.F. Lyman, D.K. Saldin, and C.J. Hirschmugl**
- 10:40 – 11:00 Refreshments**

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Friday, June 19, 2009 –AM

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Session V (continued)      Van Dyck Hall, Rm 211

**Moderator:**      **Robert Bartynski, Rutgers University**

11:00 S5.7      *The dynamics of cyclopentadienyl ligands on Cu(111)*  
**B. J. Hinch, B. Lechner, H. Hedgeland, A. P. Jardine, W. Allison,**  
**and J. Ellis**

11:20 S5.8      *Low energy ion scattering and recoil maps*  
**Robert D. Kolasinski, Josh A. Whaley, and Robert Bastasz**

11:40 S5.9      *Three-dimensional imaging and quantification of short-range chemical forces with picometer resolution*  
**M. Z. Baykara, T. C. Schwendemann, B. J. Albers, N. Pilet,**  
**E.I. Altman, and U. D. Schwarz**

12:00 S5.10      *Coherent X-ray surface diffraction: A new tool for surface science demonstrated on the Au(001) surface reconstruction*  
**M.S. Pierce, K.C. Chang, D. Hennessy, A. Sandy, M. Sprung,**  
**and H. You**

12:20 S5.11      *Resonance structure of photoelectron emission from multilayers designed for EUV lithography*  
**N. S. Faradzhev, S. B. Hill, T. B. Lucatorto, B. V. Yakshinskiy,**  
**and R.A. Bartynski**

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12:40      **Conference Close**

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12:45      **Checkout      Stonier Hall**

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**Lunch      College Avenue Student Center**

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## Posters

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- P1 *Nonlinear Light Scattering at the Surface of Silver Nanoparticles: Probing Molecular Adsorption and Surface Structure*  
**Wei Gan, Grazia Gonella, Min Zhang and Hai-Lung Dai**
- P2 *Adsorption of Cyclopentadiene on Cu(100)*  
**Chang Liu, E. Z. Ciftlikli, Everett Lee, Levan Tskipuri, R.A. Bartynski and B. J. Hinch**
- P3 *Reaction Pathways for MethylChloroSilane recombination on Cu(001)*  
**James Lallo, Everett Lee, B.J. Hinch and Dan Strongin**
- P4 *Subsurface and Surface H+CO Reaction Paths on Ni, Pt/Ni, and Cu/Ni Clusters*  
**Kennth Haug and Will Isley**
- P5 *Surface chemistry over nano-faceted Ir and Ru:bridging the material gap in heterogeneous catalysis*  
**Wenhua Chen, Quantong Shen, Hao Wang and Robert A. Bartynski**
- P6 *Characterization of Aluminum Oxide Tunnel Barrier for use in a Non-Local Spin Detection Device*  
**J. Abel, J. Garramone, I. Sitnitsky, E. Bersch, A.C. Diebold, and V. LaBella**
- P7 *X-ray Photoemission Spectroscopy and Spectroscopic Ellipsometry Characterization of HfO<sub>2</sub>, Hafnium Silicate and Nitrided Hafnium Silicate Films on SiO<sub>2</sub>/Si*  
**E. Bersch, M. Di, S. Consiglio, R.D. Clark, G.J. Leusink, and A.C. Diebold**
- P8 *UHV-interfaced viscous-flow ALD reactor for production of Polar Oxides*  
**K. Pradhan and P.F. Lyman**
- P9 *Determination of the Oxide Layer Thickness in Core-Shell Zerovalent Iron Nanoparticles*  
**Mauricio A. V. Ramos, John E. Martin, Andrew A. Herzing, Weile Yan, Xiao-qin Li, Bruce E. Koel, Christopher J. Kiely, and Wei-xian Zhang**
- P10 *Structural Optimization and Polarization Calculation of Perovskite Sulfides*  
**Michael Rutenberg Schoenberg, Joseph W. Bennett, Ilya Grinberg and Andrew M. Rappe**
- P11 *Evolution of electrical, chemical, structural properties of transparent and conducting chemically derived graphene thin film*  
**Cecilia Mattevi, Goki Eda, Stefano Agnoli, Steve Miller, K. Andre Mkhoyan, Özgür Çelik, Daniel Mastrogiovanni, Gaetano Granozzi, Eric Garfunkel, and Manish Chhowalla**



## Posters (continued)

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- P12 *Atomic-Scale Studies of SrTiO<sub>3</sub> and EuTiO<sub>3</sub> films on SrTiO<sub>3</sub> by Scanning Transmission Electron Microscopy*  
**Hui-Qiong Wang, John D. Ferguson, Lukas Swanson, Huolin L. Xin, Lena Fitting Kourkoutis, Arthur R. Woll, Joel D. Brock and David A. Muller**
- P13 *Interaction of selected hydrocarbons with TiO<sub>2</sub> surface: Relevance to extreme ultraviolet lithography (EUVL)*  
**Boris Yakshinskiy, Shimon Zalkind, and Robert Bartynski**
- P14 *The effect of “self-cleaning” ALD growth on the electrical properties of metal/Al<sub>2</sub>O<sub>3</sub>/GaAs MOS capacitors*  
**L. Yu, H.D. Lee, T Feng, D.D.T Mastrogiovanni, A. Wan, T. Gustafsson and E. Garfunkel**
- P15 *Quasi – 1 D electronic structure of silver nanowires*  
**A. Sekharan, F. Wang, F. Womack, O. Kizilkaya, , M. Patterson, Richard L. Kurtz, and Phillip T. Sprunger**
- P16 *Surface Segregation and Oxygen Adsorption at a Pd<sub>3</sub>Fe(111) Alloy Surface*  
**Xiaofang Yang, Guangzhi Liu, Bruce E. Koel**
- P17 *Thin Films as Anti-Relaxation Coatings for Atomic Magnetometers*  
**Amber Hibberd, Dave Rampulla, Scott Seltzer, Mike Romalis, Steven Bernasek**
- P18 *In-situ X-ray photoelectron spectroscopy of the reduction of SnO<sub>x</sub> films on Pt(111)*  
**Guangzhi F. Liu, Hendrik Bluhm, and Bruce E. Koel**
- P19 *Electronic structure of zinc tetraphenylporphyrin derivatives adsorbed on TiO<sub>2</sub>(110) and ZnO(11-20)*  
**Senia Katalinic, Sylvie Rangan, Ryan Thorpe, Robert A. Bartynski**
- P20 *Germanium Nanowire Growth and Characterization*  
**Lauren A. Klein, Daniel D. T. Mastrogiovanni, Alan S. Wan and Eric Garfunkel**
- P21 *Photoluminescence from Germanium Quantum Dot Structures on Silicon Buffer Layers*  
**M. Coppinger, N. Sustersic, L. Nataraj, M. Kim, S. G. Cloutier and J. Kolodzey**

## Posters (continued)

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- P22 *Identification and Quantification of Oxygen-Containing Functionalities on the Surface of Carbon Nanotubes by Fluorescence Labeling of Surface Species (FLOSS)*  
**Nikolay Dementev, Xue Feng and Eric Borguet**
- P23 *Methyltrimethoxysilane (MTES)– Dimethyldimethoxysilane (DMDES) Melting Gels for Sidewall Spacers*  
**Louis Gambino, Mathew Migliaccio, Andrei Jitianu, and Lisa C. Klein**
- P24 *Hydrogen-Bonding vs. van der Waals Forces: Probing the Balance between Intermolecular Forces with STM*  
**Pearl N. Dickerson, Amber M. Hibberd, Nuri Oncel, and Steven L. Bernasek**