# 2009 Physical Electronics Conference Final Program

## Tuesday, June 16, 2009

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>5:00 – 8:00 pm</td>
<td>Registration and Welcome Reception- Stonier Hall</td>
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## Wednesday, June 17, 2009 – AM

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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00 am</td>
<td>Registration Van Dyck Hall, Room 211</td>
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<tr>
<td>8:00 – 8:40</td>
<td>Opening and Welcome Van Dyck Hall, Room 211</td>
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### Session I

Van Dyck Hall, Room 211

**Moderator:** Eric Garfunkel, Rutgers University

<table>
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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:40</td>
<td>S1.1 An STM study of atomic Co wires</td>
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<tr>
<td>9:00</td>
<td>S1.2 Metal film growth on alloy surfaces: Deposition of Ni &amp; Al on NiAl(110)</td>
</tr>
<tr>
<td>Dapeng Jing, Barış Ünal, Yong Han, J.W. Evans and P. Thiel</td>
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<tr>
<td>9:20</td>
<td>S1.3 Investigation of hot electron transport properties of thin copper films using ballistic electron emission microscopy</td>
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<tr>
<td>John Garramone, Joseph Abel, Ilona Sitnitsky and Vincent LaBella</td>
<td></td>
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<tr>
<td>9:40</td>
<td>S1.4 Photo-switching of single-molecule and one-dimensional assemblies of azobenzene molecules in precise nanoscale environments</td>
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<tr>
<td>Ajeet S. Kumar and Paul S. Weiss</td>
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10:00 – 10:20 Refreshments

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

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>10:20</td>
<td>S1.5 Properties of perfect stripe arrays on B-doped Si(100)</td>
</tr>
<tr>
<td>I. Ermanoski, G. L. Kellogg and N. C. Bartelt</td>
<td></td>
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<tr>
<td>10:40</td>
<td>S1.6 The production of near-atomically-flat Si(100) surfaces</td>
</tr>
<tr>
<td>Ankush Gupta, Ian T. Clark, Brandon S. Aldinger and Melissa A. Hines</td>
<td></td>
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<tr>
<td>11:00</td>
<td>S1.7 Nanopatterning of Si(111) surfaces</td>
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(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 PbMg_{1/4} Ti_{3/4}Nb_{1/2}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 LaCoO_{3} films*

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 BaFe_{2}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

(Continued on next page)
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>3:40</td>
<td>S2.5</td>
<td>Local ordering of water on anatase TiO$_2$(101)</td>
<td>Ulrike Diebold, Yunbin He, Olga Dulub, Antonio Tiloca, and Annabella Selloni</td>
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<tr>
<td>4:00</td>
<td>S2.6</td>
<td>Energy level alignment of zinc tetraphenylporphyrins derivatives adsorbed on wide band gap semiconductor oxides</td>
<td>S. Rangan, S. Katalinic, R. Thorpe, R. A. Bartynski, J. Rochford and E. Galoppini</td>
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4:40 – 6:30 Session III: Posters  Stonier Hall – Common Room

6:30 – 8:30 BBQ Picnic  Rutgers Gardens
Buses depart Stonier Hall at 6:15 pm

8:30 – 10:30 Session III: Posters  Stonier Hall – Common Room
Thursday, June 18, 2009 – AM

Session IV- Van Dyck Hall, Rm 211  Nottingham Competition

<table>
<thead>
<tr>
<th>Time</th>
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| 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 moiré of graphene on Ir(111)  
|       |         | Alpha T. N'Diaye* and Thomas Michely |

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<td>10:20 – 10:40</td>
<td>Refreshments</td>
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Moderator:  Carl Ventrice, Jr., Texas State University

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<th>Time</th>
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| 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. Narayananamurti |
| 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 Ga₂Se₃ as a candidate dilute magnetic semiconductor  
|       |         | Esmeralda Vitamben* and M.A. Olmstead |

12:20 – 1:40  Lunch Break  Brower Commons

* Denotes competitor for Nottingham Prize
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: Γ surface state of Be(0001)
TeYu Chien* and E. W. Plummer

2:40 N.12 The electronic band structure of highly spin polarized CoS$_2$
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. Stottlemyer* 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

6:00 - 7:00 Break

7:00 – 9:00 Conference Banquet & Awards Presentation  
Steakhouse 85  
85 Church St., New Brunswick, NJ
Friday, June 19, 2009 – AM

Session V     Van Dyck Hall, Rm 211

Moderator:  Bruce Koel, Lehigh University

8:40  S5.1  Band alignment at high-κ/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$_2$O$_3$(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$_2$O$_3$
       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)-(1x1) surface

10:40 – 11:00  Refreshments

(Continued on next page)
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*

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

12:40  
Conference Close

12:45  
Checkout    Stonier Hall
Lunch    College Avenue Student Center
**Posters**

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*
Kenneth 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 HfO₂, Hafnium Silicate and Nitrided Hafnium Silicate Films on SiO₂/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 Zerova lent 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)

P12  Atomic-Scale Studies of SrTiO\textsubscript{3} and EuTiO\textsubscript{3} films on SrTiO\textsubscript{3} 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\textsubscript{2} 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\textsubscript{2}O\textsubscript{3}/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 Pd3Fe(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\textsubscript{x} films on Pt(111)

Guangzhi F. Liu, Hendrik Bluhm, and Bruce E. Koel

P19  Electronic structure of zinc tetraphenylporphyrin derivatives adsorbed on TiO\textsubscript{2}(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)

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