



# 15<sup>th</sup> Annual Kentucky EPSCOR Conference

Experimental Program to Stimulate Competitive Research

*Science's Grand Challenges*

## **POSTER PRESENTATIONS**

### **Preface**

A total of ninety-six topics have been accepted for poster presentation. These presentations represent the growing commitment to increase the prominence of research and development activities within Kentucky.

The Kentucky EPSCoR Program is committed to enhancing the research and intellectual capacity of its universities and colleges by building and coordinating strategic investments in human capital and physical infrastructures. Since FY2001, Kentucky EPSCoR has worked to secure over \$187 million in Federal R&D funding for the Commonwealth's universities. EPSCoR's receipt of state leveraging funds for R&D has been crucial in achieving this level of Federal funding support from the following agencies:

- National Institutes of Health (NIH)
- National Science Foundation (NSF)
- National Aeronautics and Space Administration (NASA)
- Department of Energy (DOE)
- Department of Defense (DEPSCoR)
- Environmental Protection Agency (EPA)
- Department of Agriculture (USDA)

### **Abstracts**

During the conference: if you would like a printed copy of the abstracts which accompany the poster presentations, please ask for one at the registration table.

A downloadable copy of the abstracts will be made available after the conference on our website at: [www.kyepscor.org](http://www.kyepscor.org)



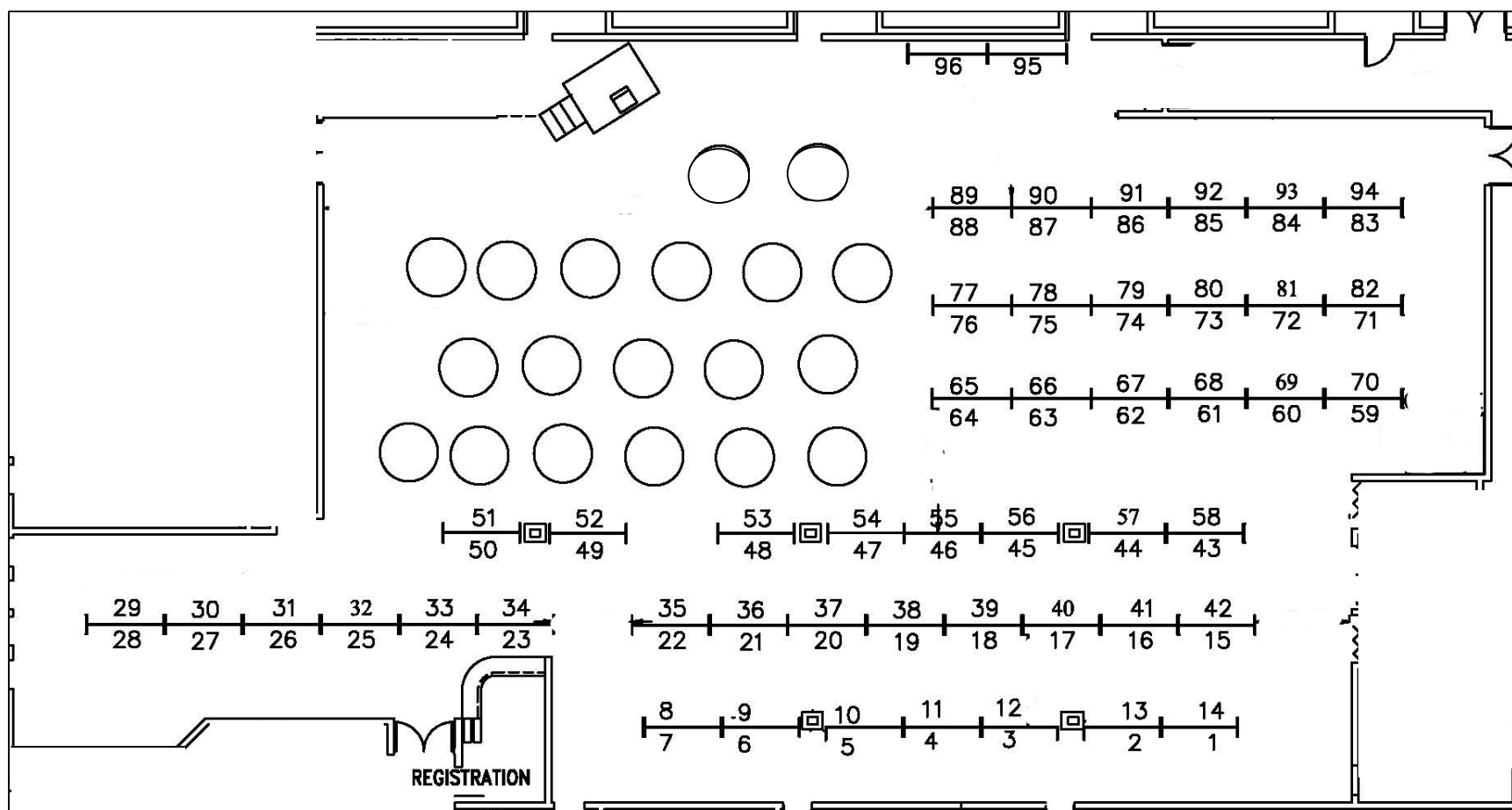
# 15<sup>th</sup> Annual Kentucky EPSCoR Conference

Experimental Program to Stimulate Competitive Research

*Science's Grand Challenges*

## LOCATIONS

In order to facilitate interaction among researchers in different areas, this year, the poster presentations have been randomly arranged. Please see the following **Table of Contents** for a list of the posters grouped by their primary federal funding agency. The poster number will be located to the left of the project's title. Use the map below to find the poster's location. The boards are ordered in serpentine rows across the room from right to left.



## Poster Presentations Table of Contents

Poster #                      Title, Researchers, & Affiliations

Projects funded in part or whole by:

**DOE**

**82 Evaporation-Driven Synthesis of Photoactive Semiconducting Films with Oriented Cylindrical Nanopores** Stephen E. Rankin, Qingliu Wu and Venkat R. Koganti, Department of Chemical & Materials Engineering, University of Kentucky, Lexington, KY 40506-0046

**56 Copper And Arsenic Concentration And Speciation In Soil Adjacent To Chromated Copperarsenate (Cca) Treated Lumber Fence Posts Along A Topohydrosequence** Donald R. Schwer III and Dr. David McNear, University of Kentucky Plant and Soil Science Department

**57 Nanoscale Bubble Valves On CNT Membranes For Chemical Energy Storage** Xin Su, Ji Wu, Bruce J. Hinds Department of Chemical and Materials Engineering University of Kentucky

**58 Catalytic Activity of Ultrathin Pt Films on Aligned Carbon Nanotube Arrays** Xin Su, Ji Wu, Bruce J. Hinds Department of Chemical and Materials Engineering University of Kentucky

**25 Large Area Conical Carbon Nanotube (CCNT) Arrays: Field Emission and Thermionic Emission Characteristics** Santosh Rupa Dumpala, Mahendra K. Sunkara, Chemical Engineering, Abdelilah Safir, Robert W. Cohn ElectroOptics Research Institute and Nanotechnology Center, David Mudd, Gamini U. Sumanasekera, Physics, University of Louisville, Louisville, KY

**83 Theoretical Estimation Of The Electronic Structure And Properties Of Gasbxn1-X Alloys** Madhu Menon<sup>1</sup>, Michael Sheetz<sup>1</sup>, Chandrashekhara Pendyala<sup>2</sup> and Mahendra Sunkara<sup>2,3</sup>  
<sup>1</sup>Center for Computational Sciences, University of Kentucky, Lexington, KY 40508, <sup>2</sup>Department of Chemical Engineering, University of Louisville, Louisville, KY 40292, <sup>3</sup>Conn Center for Renewable Energy Research, University of Louisville, Louisville, KY

**84 Growth Mechanism and Properties of Ternary InxGa1-Xn Alloys On GaN Nanowires** Chandrashekhara Pendyala, Chemical Engineering, University of Louisville, Louisville, KY, Jacek Jasinski, Conn Center for Renewable Energy Research, University of Louisville, Louisville, KY, Mahendra Sunkara, Conn Center for Renewable Energy Research and Department of Chemical Engineering, University of Louisville, Louisville, KY

**85 Surface Properties Of Sno2 Nanowires For Enhanced Performance With Dye-Sensitized Solar Cells** Suresh Gubbala,<sup>1</sup> Harry B. Russell,<sup>1</sup> Hemant Shah,<sup>2</sup> Biswapriya Deb,<sup>4</sup> Jacek Jasinski,<sup>4</sup> Heather Rypkema,<sup>3</sup> and Mahendra K. Sunkara<sup>1</sup>; <sup>1</sup>Department of Chemical Engineering, <sup>2</sup>Department of Electrical and Computer Engineering, <sup>3</sup>Department of Chemistry, <sup>4</sup>Institute for Advanced Materials and Renewable Energy University of Louisville, Louisville, KY 40292, \*Contact: mahendra@louisville.edu

Projects funded in part or whole by:

## EPA

**18 Winter Bluebirds, Vagrant Robins, And Breeding Warblers: The Response Of Migratory Birds To Global Change** David Brown, Todd Weinkam, Shannon Tegge, Gregg Janos, Gail Miller Department of Biological Sciences, Eastern Kentucky University

Projects funded in part or whole by:

## DOD

**19 Catalase Loaded Biodegradable Hydrogel For The Prevention Of Bacterial Diversification** Justin Byarski, Paritosh Wattamwar, Dipti Biswal, Nitin S. Satarkar, J. Zach Hilt and Thomas Dziubla Department of Chemical and Materials Engineering University of Kentucky, Lexington, KY 40506

**78 Integration of Thick Film PZT Devices with Commercial LTCC Electronic Packaging Materials and Processing** W. Zhang, and R.E. Eitel Department of Chemical and Materials Engineering, University of Kentucky 177 F. Paul Anderson Tower, Lexington, KY, 40506

**38 Real Time Monitoring of Endothelial Cell Permeability Using Trans Endothelial Electrical Resistance** Justin Poag, Bill Merke, Dr. Kim Anderson, Dr. Thomas Dziubla, Dr. Richard Eitel

**52 Antioxidant Polymers to Suppress Oxidative Stress Injury** Paritosh Wattamwar, Dipti Biswal, J. Zach Hilt, K Anderson, R Eitel and Thomas Dziubla Department of Chemical and Materials Engineering, University of Kentucky, Lexington, KY 40506

**14 Landmine Detection and Context-Dependent Fusion** Hichem Frigui -- University of Louisville, Lijun Zhang -- Emory University

Projects funded in part or whole by:

## NASA

**4 Mgrf-Based Change Detection Using Sift-Based Multi-Spectral Registration Of Remotesensing Images** Aly A. Farag, Mostafa A. Abdelrahman, Mike Miller, Aly Abdelrahim, Eslam Mostafa, and Cambron Carter CVIP Laboratory, University of Louisville, Louisville, KY

**37 Bi-Stable Thermal Actuators** Julia Aebersold, Brian Goessling, Evgeniya Moiseeva, Cindy Harnett, University of Louisville

**36 Efficacy of Countermeasures to Cardiovascular Deconditioning in Men and Women During Simulated Moon Explorations** JM Evans, Patwardhan, S Wang, RJ Schneider, L Mohney, L Kropak, CF Knapp, (University of Kentucky) SH Platts, MB Stenger, T Matz, TT Schlegel, (Johnson Space Center) FB Moore, (Alter-G Corp, Menlo Park CA); A. Diedrich, (Vanderbilt University).

- 20 A Multi-Wavelength Study Of The Galactic Supernova Remnant CTA**  
1 Emily Goff, Caleb Grimes, Joshua Tussey, Nathan Fite, Dr. Thomas Pannuti, Mentor,  
Department of Earth and Space Sciences, Morehead State University
- 12 A Continuing Campaign of Radio Monitoring Observations of Blazars with the Morehead State University 21-Meter Space Tracking Antenna** Caleb K. Grimes, Nathan D. Fite, Emily J. Goff, Josh M. Tussey, Thomas G. Pannuti, Mentor, Department of Earth and Space Sciences, Morehead State University
- 42 A Numerical Approach to Calculating the Flux Experienced by a Young Star in an Embedded Cluster** Lisa Holden, Edward Landis, Jeremy Spitzig, Northern Kentucky University
- 33 Physical Processes in the Rosette Nebula** Jeremy Huber, John Kielkopf, University of Louisville Department of Physics and Astronomy
- 81 Biosensing Systems that Explore Conformational Changes in Antibodies** Smita Joel<sup>1</sup>, Anjan Bhattacharya<sup>2</sup>, Boyd E. Haley<sup>1</sup>, Leonidas G. Bachas<sup>1</sup>, Sylvia Daunert<sup>1</sup>.  
1. Department of Chemistry, University of Kentucky, Lexington, Kentucky, 2. AffinityPhotoprobes, LLC, Lexington, Kentucky.
- 16 Rotating Disk Microfluidic Platforms Prepared by Three-Dimensional Printing**  
Jessica L. Moore, Isaac Mittendorf, Austin McCuiston Murray State University Department of Chemistry, Rudy Ottway Murray State University Department of Industrial and Engineering Technology R. Daniel Johnson Murray State University Department of Chemistry
- 27 Development of High-Temperature Shape Memory Alloys for Aerospace Applications** Haluk Karaca, Gurdish Ded, Burak Basaran, Sayed Saghaian, University of Kentucky Mechanical Engineering, Ronald Noebe, NASA Glenn Research Center
- 31 The Future of Artificial Muscles in Medical Devices** James J Lee, Gerold A Willing, University of Louisville
- 92 Characterization and Modeling of High Temperature Polymer Matrix Composites (HTPMCs) for Aerospace and Space Applications** Spandana Pulla, Johnson Joseph, Jared Fulcher, Y Charles Lu, Fuqian Yang, Haluk Karaca, University of Kentucky
- 32 Kentucky Space** James Lump, Space Systems Laboratory, University of Kentucky
- 40 Nanomaterials in Electronic Nose Technology** Landon Oakes and Vladimir Dobrokhoto, Applied Physics Institute, Western Kentucky University
- 35 A Search For X-Ray Counterparts To Known Optical And Candidate Radio Supernova Remnants In the Nearby Galaxy Ngc 2403** Joshua M. Tussey, Thomas G. Pannuti, Mentor, Department of Earth and Space Sciences, Morehead State University
- 90 Energy Efficient Opportunistic Trajectory Generation for a JPL Aerobot with NTG Methodology** Dr. Weizhong Zhang, Dr. Tamer Inanc (University of Louisville), Dr. Alberto Elfes (NASA)
- 39 A Search For Alkali Metals In The Atmospheres Of Exoplanets**  
Karen Collins, John Kielkopf, Department of Physics and Astronomy, University of Louisville

- 21 **Development of an Astronomy and Space Science One Carnegie Unit Course for High School Students Derived from the Kentucky Space Program** Benjamin K. Malphrus (Morehead State University Space Science Center), Jennifer B. Carter (Fleming County High School)
- 22 **Earth-Based Calibration of the Synthetic Aperture Radar onboard NASA's Lunar Reconnaissance Orbiter** Benjamin K. Malphrus, Jeffrey A. Kruth (Space Science Center at Morehead State University)
- 87 **Developing an Interorbital Systems TubeSat at Morehead State University** Tyler Rose, Tyler Burba, Clay Graves, Kelsey Koontz, Tyler Blair, Chris Bailey, Students, Bob Twigg, Mentor, Morehead State University

Projects relevant to and/or funded in part or whole by:

**NIH**

- 50 **TLR2 And TLR9 Activation By Periodontal Pathogens Induce HIV-1 Reactivation** O.A. González, M. Li, J.L. Ebersole, C.B. Huang, Center for Oral Health Research, College of Dentistry, University of Kentucky, Lexington, KY
- 11 **Polybacterial Challenge of HIV-latently Infected Macrophages and Dendritic Cells** CB Huang\*, YV Alimova, JI Ebersole Center for Oral Health Research, College of Dentistry, University of Kentucky
- 28 **Green Tea Polyphenols Mediated Apoptosis In Intestinal Epithelial Cells By Afadd-Dependent Pathway** Helieh S. Oz, DVM, PhD, Jeffrey L. Ebersole, PhD Center for Oral Health Research, College of Dentistry, University of Kentucky Medical Center, Lexington, KY
- 55 **Dynamics Of 17 Populations Of Sunflowers (Helianthus Annuus - Asteraceae) In Central Kentucky** Caitlin Costelle, Kelli Harris, Lyndsey Bolanos, Sharon Lee, and Pat Calie, Eastern Kentucky University
- 44 **Studying Germline Stem Cells using the Fruit Fly as a Model Organism** Michael Creed, Sudan Loganathan, Christina Jackson, Dan Varonin and Alexey Arkov, Murray State University
- 1 **Genetic Susceptibility to PCB-induced Developmental Neurotoxicity** Emily Altenhofen, Amber Evans, Rikki Floyd, Breann Hays, Cellestine Kamau-Cheggeh, Sarah Kraemer, Andrea Mynhier, and Ashton Samuels, Northern Kentucky University
- 23 **Insights Into the Generic Relationships Within the Family Sarraceniaceae (Ericales)** Emily Jean Hicks<sup>1</sup>, Robert F.C. Naczi<sup>2</sup>, And Pat Calie<sup>1</sup> <sup>1</sup>Eastern Kentucky University, <sup>2</sup>New York Botanical Garden
- 53 **Characterizing the Influence of Estrogen on Mirna Expression During Cardiac Hypertrophy** Rebekah L. Waikel, Patricia Holden, and Julie Castaneda, Department of Biological Sciences, Eastern Kentucky University
- 10 **The Conserved PAM-1 Aminopeptidase Somatically Regulates A Germline Ras/MAPK Signaling cascade to Promote Pachytene Exit In C. Elegans** Chris Trzepacz, Katelyn Fulcher, Department of Biological Sciences, Murray State University, Murray, KY

Projects relevant to and/or funded in part or whole by:

## NSF

- 48 **Assessing Climate-Hive Interaction on Eastern Kentucky Surface Mines** Nan Campbell (undergraduate), Dr. Tammy Horn (faculty mentor), Eastern Kentucky University
- 13 **Low Temperature Dielectric Measurements in K and Li Doped BaMnO<sub>3</sub>** Julius Schoop, Kevin Harmon, John Gruenewald, Bill Crummett; Centre College
- 80 **Microfluidic Systems for Evaluation of Cardiac Endothelial Cells Exposed to Pulsatile Andcontinuous Flow** Rosendo Estrada, Mai-Dung Nguyen, Guruprasad Giridharan and Palaniappan Sethu, Department of Bioengineering, Speed School of Engineering, University of Louisville, Louisville, KY.
- 89 **Hydrogen Bonding in the Superoxide-Hydrogen Complex** Wafaa M. Fawzy, Murray State University
- 3 **Pattern Recognition for Single-Cell Diagnostics** A. A. Fletcher, E. V. Moiseeva, and C. K. Harnett, University of Louisville
- 45 **The Response of Arctic Headwater Streams to Permafrost Degradation and Thermokarst formation** Michael B. Flinn (Murray State University), Julia Larouche, and William Breck Bowden (University of Vermont)
- 29 **Fabrication Process of Micro-Scaled Photon Actuated Structures to Serve as Artificial Myocytes** Gerlach, Hunter and Patwardhan, Abhijit (University of Kentucky)
- 5 **Gold Nanoparticles with Chitosan Coatings for Photothermal Therapy of Hepatocellular carcinoma Cells** Guandong Zhang, Justin Howell and Andre M. Gobin Bioengineering Department, University of Louisville, Louisville, KY, 40292
- 6 **The Use of PEG Hydrogels to Analyze Angiogenic Processes In Vitro** Alex Porter<sup>1</sup>, Carolyn Klinge<sup>2</sup>, Andrea S. Gobin<sup>3</sup> 1. Physiology and Biophysics, 2. Biochemistry, 3. Bioengineering, The University of Louisville, Louisville, KY
- 91 **Optical Biosensor based on a Dielectric-Metal Surface Wave Resonance** Courtney L. Byard, Xue Han, Rodrigo S. Wiederkehr, and Sergio B. Mendes, University of Louisville
- 77 **Photochemistry and Photophysics of estrogens** Kit-Yan Chan, Bridget Gavaghan, Nicholas Georgescu, Karla Irizarry, and Patrick M. Hare, Northern Kentucky University
- 15 **Instrumentation to Measure Velocity and Sediment Discharge Using Turbidity and Bendsensors to Obtain Real Time Data at The Watershed Scale** R. Stewart, J. Fox, W. Ford, A. Thompson (all from Univ of Kentucky) C. Harnett (Univ of Louisville)
- 17 **Novel Deployment Methods and Modifications of InterproScan** Tingjian Ge, Daniel Harris, Jerzy W. Jaromczyk, Christopher L. Schardl. University of Kentucky, Lexington, KY
- 86 **Kentucky Virtual Observatory and Ecological Informatics System (VOEIS) Cyberinfrastructure (CI): NSF-EPSCoR Track 2 Update** Susan Hendricks et al., Hancock Biological Station, 561 Emma Drive, Murray State University, Murray, KY

- 94 **Data Dependency Based Intrusion Detection System: A New Data Mining and Cost Efficiency Analysis Model** Yi Hu, Northern Kentucky University
- 71 **Ca<sub>3</sub>(Ru<sub>1-x</sub>Cr<sub>x</sub>)<sub>2</sub>O<sub>7</sub>: A New Paradigm for Spin Valves** O.B. Korneta, S. Chikara, L.E. DeLong, G.Cao, (University of Kentucky, Department of Physics and Astronomy, Center for Advanced Materials), P.Schlottmann (Florida State University)
- 72 **Pressure-Induced Insulating State in Rare Earth Ion (Eu, Gd) Doped Ba<sub>1-x</sub>Bi<sub>x</sub>Fe<sub>2</sub>O<sub>7</sub>** O. Korneta, S. Chikara, L. E. DeLong, G. Cao, (University of Kentucky, Department of Physics and Astronomy) S. Parkin (University of Kentucky, Department of Chemistry)
- 73 **Anomalous Metal-Insulator Transition in Sr<sub>2</sub>IrO<sub>4</sub>** O. Korneta, S. Chikara, G. Cao (University of Kentucky, Department of Physics and Astronomy, Center for Advanced Materials)
- 74 **Giant Magneto-Electric Effect in the Jeff=1/2 Insulator Sr<sub>2</sub>IrO<sub>4</sub>** S. Chikara, O. Korneta, L.DeLong, T. Qi, B. Thapa, K. Butrouna, G. Cao (Center for Advanced Materials, Department of Physics & Astronomy, University of Kentucky), W.Crummet (Centre College, Science Division), P.Schlottmann (Florida State University)
- 75 **Antiferromagnetic Metallic State and Spin Valve Effect in (Ca<sub>1-x</sub>A<sub>x</sub>)<sub>3</sub>Ru<sub>2</sub>O<sub>7</sub> (A = Sr, Ba) Single Crystals** S. Chikara, O. Korneta, T. Qi, B. Thapa, K. Butrouna, G. Cao (Center for Advanced Materials, Department of Physics & Astronomy, University of Kentucky), Wenhai Song (Institute of Solid State Physics, Hefei, China)
- 76 **Cr Doped Perovskite Ruthenate Ca<sub>2</sub>RuO<sub>4</sub>: Structurally Driven Mott Transition.** Qi, S. Chikara, O.B. Korneta, G. Cao (Center for Advanced Materials, Department of Physics, University of Kentucky)
- 67 **Synthesis of Polymer-Layered Silicate Nanocomposites Using One-Step Prepared Organoclays** Thomas Morgan & Isabelle Lagadic, Northern Kentucky University, Department of Chemistry, Nunn Dr. Natural Science Center 204F, Highland Heights, KY 41099
- 68 **Exploring Synthetic Parameters for the Preparation and Properties of Functional Organoclays** Jennifer Hand & Isabelle Lagadic, Northern Kentucky University, Department of Chemistry, Nunn Dr. Natural Science Center 204F, Highland Heights, KY 41099
- 96 **Kentucky Nanonet, Connecting Kentucky's Micro/Nano Research Community** Joseph H Lake, Thomas Roussel, Mark m. Crain, Shamus McNamara, Robert S. Keynton, Kevin M.Walsh, University of Louisville
- 95 **University of Louisville Micro/Nanotechnology Center** Kevin Walsh (UofL), Mark Crain (UofL), Joseph Lake (UofL), Curt McKenna (UofL)
- 24 **Electrode-based Detection Technique for Microfluidic Devices** E.V. Moiseeva, A.A Fletcher, and C. K. Harnett, Department of Electrical and Computer Engineering, University of Louisville
- 46 **Improving Genome Browser Infrastructure** N Moore\*, JW Jaromczyk\*, CL Schardl\*\*  
\*University of Kentucky, Department of Computer Science, \*\*University of Kentucky, Department of Plant Pathology
- 41 **Development of Porphyrin Catalysts for the Degradation of Biomass in Ionic Liquid Solvents** Terry Price Jr, Matthew Fields, Andrew Sharits, Laurel Morton, Department of Chemistry, Eastern Kentucky University, Richmond, KY 40475

- 88 Exploiting Osmosis for Size-based Separation of Blood Cells into Sub-populations using Microfluidics** Vahidreza Parichehreh, Kranthi Kumar Bhavanam and Palaniappan Sethu, Department of Bioengineering, Speed School of Engineering, University of Louisville
- 34 Interactions Among Ammonium Transporters of Ustilago maydis** Jinny A. Paul, Anna Hellman, and Michael H. Perlin. University of Louisville, Department of Biology, Program on Disease Evolution, Louisville, Kentucky
- 7 Bi-Directional Knudsen Pump Using a Thermoelectric Material** Kunal Pharas, Shamus McNamara. Department of Electrical and Computer Engineering, University of Louisville, KY
- 59 Osteocyte Characterization on Polydimethylsiloxane Substrates: Quantification of Functional Communication** LA Simmerman, University of Kentucky; P Sethu, University of Louisville; MM Saunders, University of Kentucky
- 60 Osteocyte Characterization on Polydimethylsiloxane Substrates: Viability, Proliferation and Sclerostin Production** LA Simmerman, University of Kentucky; JR Martin, University of Kentucky; P Sethu, University of Louisville; MM Saunders, University of Kentucky
- 61 Micro CT Assessment of Bone Organ Culture Viability and Development in a Neonatal Rat Femur Model** KM Gurley, University of Kentucky; AS Gobin, University of Louisville; MM Saunders, University of Kentucky
- 62 Mechanical Characterization of Polydimethylsiloxane for Microsystems Applications** JR Martin, University of Kentucky; S Sripada, University of Louisville; P Sethu, University of Louisville; MM Saunders, University of Kentucky
- 9 Kentucky Initiative in Ecological Genomics** Christopher L. Schardl, Jerzy Jaromczyk, Abbe Kesterson, Jennifer S. Webb, Jolanta Jaromczyk, and Neil Moore, University of Kentucky
- 93 Fast 3-D AC electroosmotic pumps with non-photolithographic electrode patterning** Yehya M. Senousy and Cindy K. Harnett Dept. of Electrical and Computer Engineering University of Louisville
- 30 2009 LSAMP Student Research Symposium** Ingrid St. Omer University of Kentucky, Kentucky - West Virginia Alliance for Minority Participation
- 8 Tufa Mineralogy of the Barstow Formation in California** Christopher Toney: Western Kentucky University, Jennifer Cole: Lamont-Doherty Earth Observatory, Columbia University, NY & Western Kentucky University, Aaron J. Celestian: Western Kentucky University
- 63 HPC User Interface, Sparse Matrix, Autonomous Sensory Network** Dan Cleland, Wen Li, John Roberts, Chi Shen, S. Bhattacharyya, M. Unuakhalu, Kentucky State University
- 64 Data Visualization of Kentucky Lake** Jennifer Green, S. Bhattacharyya, Kentucky State University
- 54 ABO Blood Group Genotyping by PCR-RFLP** Travis W Wheeler and Rebekah L Waikel, PhD, Department of Biology, Eastern Kentucky University, Richmond, KY 40475
- 79 Time-resolved spectroscopic studies of surface-immobilized proteins** Rodrigo S. Wiederkehr, Nathan A. Webster, and Sergio B. Mendes/ Department of Physics and Astronomy, University of Louisville

**69 Hybrid materials containing polyoxometalates and ruthenium(II) complexes**  
Yan-Fen Li, Bangbo Yan, Department of Chemistry, Western Kentucky University, Bowling Green, KY 42101

**70 Novel organic-inorganic hybrid materials using polyoxometalates and tetrapyrrolyl porphyrin as building units** Amanda M Smelser, Bangbo Yan, Department of Chemistry, Western Kentucky University, Bowling Green, KY 42101

**65 Generalized Bathtub Models for Binary-Transformed Climate Data** Stuart Foster, James Polcer and Jonathan Quiton, Western Kentucky University

**66 Two Climate Modeling Approaches Using Hazard-Based Stochastic Processes**  
Akim Adekpedjou, Missouri University of Science and Technology; Stuart Foster, James Polcer and Jonathan Quiton, Western Kentucky University

**26 A Swiss Army Knife Technology for Altering Plants** Guiliang Tang, Jun Qin, Ligang Ren, Shangjin Pan, Yiyu Gu, Wenjun Kang, Liuyin Ma, Haifeng Tang, Department of Plant and Soil Science & KTRDC, University of Kentucky, Lexington KY 40546

Projects funded in part or whole by:

## USDA

**47 Brushy Creek Watershed: Assessment of a Karst Drainage Basin Using Geospatial, Geochemical, and Microbial Approaches** Alice L. Jones, Terry R. Huff, Eastern Kentucky University

**51 Dynamics of Soil State Variables and Related Processes Across a Land Use Gradient in Spatial and Temporal Transition** Ole Wendroth, R.L. McCulley, M.S. Coyne, A. Karathanasis, and J.H. Grove University of Kentucky, Department of Plant and Soil Sciences, Lexington, KY

**43 High Throughput Localization Of Secreted Proteins During Penetration And Invasive Growth Of The Rice Blast Fungus Magnaporthe oryzae** Mark Farman, Xiaoyan Gong, Junhuan Xu, Oscar Hurtado, Congqing Wu. Department of Plant Pathology, University of Kentucky.

Projects funded in part or whole by:

## KY EPSCoR Infrastructure Seeding Program

**49 Development of the Kentucky Appalachian Rural Rehabilitation Network** Kitzman, P. University of Kentucky; Hunter, B. Cardinal Hill Rehabilitation Hospital; Kuperstein, J. University of Kentucky

**2 Future Electric Power System Research** Yuan Liao, University of Kentucky