



Third Annual Chemistry Research Symposium

Saturday March 10, 2018, 9:00 am - 12:00 noon
Almeda R. Jacks Ballroom & The McKissick Theatre,
Hendrix Student Center

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*Dear Faculty, Staff, Students
and Honored Guests,*

Welcome to the 2018 Chemistry Research Symposium, which highlights research performed at Clemson by our students and at other institutions by our honored guests. All of these students have worked very hard to highlight the variety and importance of research being done in chemistry. Interact with the poster authors and experience the enthusiasm and dedication they have for their work. Enthusiasm is contagious, and we hope that you will be inspired by your conversations with them to want to know more. Science isn't hard work for the curious, but it does provide education and training for a wide variety of careers and vocations, and chemistry, as the central science, provides a jumping off point to a world full of opportunities.

We hope you enjoy your time with us!

*Bill Pennington,
Chair*

Keynote Lecture

Chemistry on Mars: Zapping Rocks with the ChemCam Laser on Curiosity

Dr. Roger C. Wiens, Space Remote Sensing Group, Los Alamos National Laboratory, University of New Mexico

Dr. Wiens received a BS in Physics from Wheaton College and a PhD from the University of Minnesota doing research on meteorites and moon rocks. He spent two years at the Scripps Institution of Oceanography where he studied isotopes of He, Ne, Ar, and N in terrestrial rocks. He worked for seven years in the Geological and Planetary Sciences Division at Caltech continuing to study meteorites. In 1997 he joined the Space and Atmospheric Sciences group at Los Alamos National Laboratory, where he began developing new instruments for other space missions.

Since 2004, Dr. Wiens has been the leader of the ChemCam laser instrument on the Curiosity rover. He has directed the US and French team operating ChemCam and interpreted the data returned from Mars. He has been involved in other NASA missions as well, including Stardust, Mars Odyssey, Lunar Prospector, and Deep Space-One. He was selected to lead the development of the SuperCam instrument for NASA's next Mars rover, due to fly in 2020.

Dr. Wiens was knighted by the government of France for his work in “forging strong ties between the French and American scientific communities” and for “inspiring many young, ambitious earthlings.”

Dr. Wiens also wrote a book entitled “*Red Rover: Inside the Story of Robotic Space Exploration from Genesis to the Mars Rover Curiosity*”, published in 2013. He has a vision to communicate to the public the adventure and challenge of space exploration and to encourage others to pursue their dream despite the obstacles.

POSTER NUMBER	POSTER TITLE
1	<p>ANALYSIS OF PHYTOESTROGENS FOUND IN THE SYMBIOTIC RELATIONSHIP BETWEEN SEA ANEMONE AND ALGAE USING HPLC UV-VIS AND MS</p> <p>Kathleen Mowery, Alison Roark, and Nicholas Kuklinski</p>
2	<p>EFFECT OF HUMIC ACID TREATMENT ON THE REMOVAL OF METHYLENE BLUE FROM AQUEOUS SOLUTION</p> <p>Rhianna Wolsleger, Oscar Ruiz, and Gabriela Chilom</p>
3	<p>SPATIAL HETERODYNE SPECTROMETER FOR REMOTE LIBS AND RAMAN SPECTROSCOPY USING FRESNEL COLLECTION OPTICS</p> <p>Ashley Allen, and S. Michael Angel</p>
4	<p>IMPACT OF LIGAND LEWIS BASICITIES ON PHOTOLUMINESCENT LIFETIMES IN LEAD HALIDE PEROVSKITES</p> <p>Margaret Gerthoffer, Kyle T. Munson, John F. Swartzfager, and John B. Asbury</p>
5	<p>DETERMINATION OF ADSORPTION OF METHYLENE BLUE & NICKEL IN PINEAPPLE PEELS</p> <p>Kaylan Kelsey, Makenzie Reynolds, Callie Smith, Samantha Harrell, and Dr. Venita Totten</p>
6	<p>EVALUATING THE EFFECT OF N-HETEROCYCLES AS INHIBITORS OF AMYLOID-B AGGREGATION: POTENTIAL EFFECT OF π-STACKING</p> <p>Matthew Hurtt, Dr. Robin Lammi, and Dr. James Hanna</p>
7	<p>CERVICAL INTERBODY SPACER WITH PASSIVE RADIOGRAPHIC FUSION STATUS INDICATOR</p> <p>Paul W Millhouse, Md. Arifuzzaman, Apeksha C Rajamanthrilage, Nathan T Carrington, Caleb Behrend, John D DesJardins, and Jeffrey N Anker</p>

POSTER NUMBER	POSTER TITLE
8	<p>NEXT GENERATION IMPLANTABLE CHEMICAL SENSOR TO DETECT INFECTION IN RADIOGRAPHY</p> <p>Md. Arifuzzaman, Paul W. Millhouse, Yash Raval, Thomas B. Pace, Caleb J. Behrend, John D. DesJardins, Tzuen-Rong J. Tzeng, and Jeffrey N. Anker</p>
9	<p>DEVELOPING A PH SENSITIVE COATING FOR MEDICAL IMPLANTS TO NONINVASIVELY DETECT AND MONITOR IMPLANT ASSOCIATED INFECTION</p> <p>Unaiza Uzair, Donald Benza, Yash Raval, Tzuen-Rong Tzeng, and Jeffrey Anker</p>
10	<p>TOWARD X-RAY EXCITED OPTOGENETICS</p> <p>Matthew Case, Donald Benza, Gretchen Schober, Meenakshi Ranasinghe, Eric Zhang, Mary Kathryn Burdette, Stephen Foulger, and Jeffrey Anker</p>
11	<p>NON- INVASIVELY MONITORING TIBIAL PLATE BENDING WITH AN IMPLANTABLE HYDRAULIC SENSOR, READ VIA PLAIN RADIOGRAPHY</p> <p>Apeksha Rajamanthrilage, Md. Arifuzzaman, Paul W Millhouse, Hunter Pelham, Nathan Carrington , Caleb J. Behrend, John D. DesJardins, Thomas B. Pace, and Jeffrey N. Anker,</p>
12	<p>TOWARD IMAGING RADIO-PHARMACEUTICALS NEAR IMPLANTED BIOMEDICAL DEVICES IN VIVO</p> <p>Gretchen B. Schober, Donald Benza, Unaiza Uzair, Yash Raval, Tzuen-Rong J. Tzeng, and Jeffrey Anker</p>
13	<p>DEVELOPING A MOISTURE SENSOR FOR THE DYNAMIC HIP SCREW</p> <p>K.M.S.D. Kiridena, Uthpala N. Wijayaratra, and Jeffrey N. Anker</p>

POSTER NUMBER	POSTER TITLE
14	<p>DEVELOPING A HYDROGEL SENSOR FOR THE BIOPSY MARKER CLIP</p> <p>Uthpala N. Wijayaratna, K.M.S.D Kiridena, Md. Arifuzzaman, and Jeffrey N. Anker</p>
15	<p>TUNING THE SURFACE PLASMON RESONANCE BY PATTERNING SILVER NANOPARTICLES USING GLUCOSE CRYSTAL DEPOSITION AND MECHANICAL DEFORMATION</p> <p>Meenakshi Ranasinghe, Fathima Ameer, Tatiana Estrada-Mendoza, George Chumanov, and Jeffrey Anker</p>
16	<p>STRUCTURAL MODIFICATION IN BISBENZIMIDAZOLE ANALOGS FOR SELECTIVE INHIBITION OF E. COLI TOPOISOMERASE I.</p> <p>Geoff Chesser, Shalika Meedin, and Dev P. Arya*</p>
17	<p>STABILITY OF COPPER(II) COMPLEXES OF SULFUR AND SELENIUM ANTIOXIDANTS</p> <p>Jaime M. Murphy, Brian A. Powell, and Julia Brumaghim</p>
18	<p>YEAH, BUT WHICH ANTIOXIDANT? METALS, MECHANISMS, AND THE SEARCH FOR PREDICTIVE STRUCTURE-ACTIVITY RELATIONSHIPS</p> <p>Deanna Pollard, and Andrew Reynolds, and Dr. Julia L. Brumaghim</p>
19	<p>PROBING AMINO ACID ADSORPTION ON POLYSTYRENE NANOPARTICLE SURFACES BY USING STD-NMR</p> <p>Yunzhi Zhang, and Leah B. Casabianca</p>
20	<p>EXPLORING THE INCORPORATION OF GD(TTA)₃ INTO POLYSTYRENE NANOPARTICLES AS POTENTIAL MRI CONTRAST AGENTS</p> <p>Hui Xu, Muskendol Novoa, Yunzhi Zhang, Jason McNeill, and Leah B. Casabianca</p>

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21	STABILIZATION OF 2-D NANOPARTICLE ARRAYS Tatiana A. Estrada-Mendoza , Yimei Wen, and George Chumanov
22	CARBON NANOFIBERS FROM HYDROTHERMAL TREATMENT OF CELLULOSE NANOCRYSTALS Yimei Wen , Mingzhe Jiang, Christopher L. Kitchens, and George Chumanov
23	ENGINEERED CURRENT COLLECTOR INTERFACE FOR HIGH ENERGY DENSITY LI-ION BATTERIES Lakshman Ventrappagada , Apparao Rao, Ramakrishna Podila, and Stephen Creager
24	STUDY OF THE EFFECTS OF NAFION PERCENTAGE IN MEMBRANE-ELECTRODE ASSEMBLIES Tyler Dindinger , Saheed Bukola, and Stephen Creager
25	STUDING CHEMICALLY MODIFIED AMPHIPHILIC TRIPEPTIDE CATALYSIS BY MOLECULAR DYNAMICS SIMULATION Lisi Wang , and Brian Dominy
26	ASSESSING PROTEIN ADSORPTION OF CONCAVALIN A UTILIZING K-MEANS CLUSTERING AND CHARMM POTENTIAL ENERGY CALCULATIONS Richard Overstreet, and Brian Dominy
27	CRYSTAL GROWTH ANALYSIS OF A COMPLEX IONIC SALT Justin Talbert , Dr. Shiou-Jyh Hwu, and Brian Dominy
28	CARBON TAPE AS CONVENIENT ELECTRODE MATERIAL FOR ELECTROCHEMICAL PAPER-BASED MICROFLUIDIC DEVICES (EPADS) Paige Reed , M. Fernanda Mora and Carlos Garica

POSTER NUMBER	POSTER TITLE
29	<p>ELECTROCHEMICAL PAPER-BASED MICROFLUIDIC DEVICES TO DETECT AMINO ACID CHIRALITY</p> <p>Paige Reed, M. Fernanda Mora and Carlos Garica</p>
30	<p>DETERMINATION OF TOPIRAMATE BY CAPILLARY ELECTROPHORESIS WITH CAPACITIVELY-COUPLED CONTACTLESS CONDUCTIVITY DETECTION: A POWERFUL TOOL FOR THERAPEUTIC MONITORING IN EPILEPTIC PATIENTS</p> <p>Aline Akemi Ishikawa, Rodrigo Moreira da Silva, Mauro Sérgio Ferreira Santos, Eric Tavares da Costa, Americo Ceiki Sakamoto, Emanuel Carrilho, Cristiane Masetto Gaitani, and Carlos D. Garcia</p>
31	<p>ELECTROCHEMICAL CRYSTAL GROWTH OF POM-BASED COMPLEX OXIDES</p> <p>Qiuying Zhang, Joseph Ondus, and Shiou-Jyh Hwu</p>
32	<p>SYNTHESIS AND CRYSTAL STRUCTURES OF TWO NEW GREENWOODITES: $K_2V_{II}VII_7CO_{III}2O_6(CO_{II},CO_{III}O_4)_2(VVO_4)_2$ AND $BA_2FE_{III}9O_6(Fe_{II},Fe_{III}O_4)_2(GEO_4)_2$.</p> <p>Megan Smart, Tiffany M. Smith Pellizzeri, Colin D. McMillen, and Joseph W. Kolis</p>
33	<p>SYNTHESIS AND OPTICAL CHARACTERIZATION OF GADOLINIUM-CONTAINING SCINTILLATING NANOPARTICLES TO ENABLE NEURAL STIMULATION</p> <p>Ashley A. Dickey, Eric Zhang and Stephen H. Foulger, and Joseph W. Kolis</p>
34	<p>SYNTHESIS AND STRUCTURAL CHARACTERIZATION OF LANTHANIDE CONTAINING TANTALUM AND RHENIUM COMPLEXES</p> <p>Muditha T. K. Kolambage, Colin D. McMillen, and Joseph W. Kolis</p>

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35	<p>HYDROTHERMAL GROWTH OF THE THEORETICAL QUANTUM SPIN LIQUID PYROCHLORE STANNATE $CE_2SN_2O_7$</p> <p>Matthew Powell, Colin McMillen, and Joe Kolis</p>
36	<p>INTERFACING THE LIQUID SAMPLING – ATMOSPHERIC PRESSURE GLOW DISCHARGE ION SOURCE WITH A WATERS QDA MASS SPECTROMETER: A PRELIMINARY STUDY</p> <p>Edward D. Hoegg, Bhunit Patel, Douglas Richardson, and R. Kenneth Marcus</p>
37	<p>COUPLING OF A LIQUID SAMPLING – ATMOSPHERIC PRESSURE GLOW DISCHARGE (LS-APGD) MICROPLASMA WITH A COMMERCIAL TRIPLE-QUADRUPOLE MASS SPECTROMETER</p> <p>Tyler Williams, and R. Kenneth Marcus</p>
38	<p>MICROWAVE-ASSISTED GRAFTING POLYMERIZATION OF CAPILLARY-CHANNELED POLYMER (C-CP) NYLON FIBERS FOR IMMOBILIZED METAL-ION AFFINITY CHROMATOGRAPHY (IMAC) PROTEIN SEPARATIONS</p> <p>Hung Trang, and R. Kenneth Marcus</p>
39	<p>DEVELOPMENTS IN THE LIQUID SAMPLING – ATMOSPHERIC PRESSURE GLOW DISCHARGE MICROPLASMA AS A SOURCE FOR OPTICAL EMISSION SPECTROSCOPY</p> <p>Katja A. Hall, and R. Kenneth Marcus</p>
40	<p>NOVEL HIC CAPTURE PHASE FOR IMPROVED TWO-DIMENSIONAL PROTEIN A/SEC SEPARATION OF MONOCLONAL ANTIBODIES</p> <p>Lei Wang, and R. Kenneth Marcus</p>
41	<p>EXOSOME ISOLATION FROM CELL CULTURE MILIEU BY HIC ON POLYESTER CAPILLARY-CHANNELED POLYMER FIBER PHASE</p> <p>Sisi Huang, and R. Kenneth Marcus</p>

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42	<p>COMPARISON BETWEEN PP4 AND PPY CAPILLARY-CHANNELED POLYMER (C-CP) FIBERS IN REVERSED PHASE PROTEIN SEPARATION</p> <p>Katherine Youmans, R. Ken Marcus</p>
43	<p>HYDROPHOBIC SUBSTRATES FOR SOLUTION RESIDUE ANALYSIS UTILIZING AN AMBIENT DESORPTION LIQUID SAMPLING-ATMOSPHERIC PRESSURE GLOW DISCHARGE MICROPLASMA</p> <p>Htoo W. Paing, and R. Kenneth Marcus</p>
44	<p>ENHANCED SUPERRESOLUTION IMAGING USING TELEGRAPH NOISE IN CONJUGATED POLYMER NANOPARTICLES</p> <p>Yifei Jiang, Muskendol Novoa, Teeranan Nongnual, Liaoran Cao, Rhonda Powell, Terri Bruce, and Jason McNeill</p>
45	<p>X-PANDING AROUND TRIMETHYLPHENYLAMMONIUM: HALOGEN BONDING IN [NME₃PH]₃·RI COCRYSTALS</p> <p>Khadijatul Kobra, Colin D. McMillen and William T. Pennington</p>
46	<p>BIOCHROMATIC SENSORS FOR FOOD SAFETY</p> <p>Erica Castiglione, Jared Melnychuk, Grant MacPherson, Khadijatul Kobra, and William T. Pennington</p>
47	<p>NANO-GLASSES FORMED BY ENSEMBLES OF CONFINED CONJUGATED POLYMERS: MOLECULAR DYNAMICS SIMULATION STUDIES</p> <p>Supun S. Mohottalalage, Sidath Wijesinghe, Gary S. Grest, and Dvora Perahia</p>
48	<p>EFFECTS OF BRANCHING ON RHEOLOGY OF POLYETHYLENE COMBS: A MOLECULAR DYNAMICS SIMULATION STUDY</p> <p>Sidath Wijesinghe, Gary S. Grest, and Dvora Perahia</p>

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49	<p>SOLVENT RESPONSE OF IONIC CO-POLYMERS</p> <p>Chathurika Kosgallana, and Dvora Perahia,</p>
50	<p>EFFECT OF SOLVENT POLARITY ON ASSOCIATION OF IONIZABLE BLOCK COPOLYMER IN SOLUTIONS: A MOLECULAR DYNAMIC SIMULATION STUDY</p> <p>Manjula Senanayake, Dipak Aryal, Gary S. Grest, and Dvora Perahia</p>
51	<p>STIMULI-RESPONSIVE FUNCTIONAL MATERIALS</p> <p>Monica A. Gordillo, Amina Khatun, Andrei Palukoshka, Kyle Beard, Dillip K. Panda and Sourav Saha</p>
52	<p>ANION AND ION-PAIR RECOGNITION WITH π-ACIDIC AND LEWIS ACIDIC RECEPTORS</p> <p>Krishnendu Maity, Dillip K. Panda, Robert J. Gallup, and Sourav Saha</p>
53	<p>ZERO-DIMENSIONAL CARBON ALLOTROPS – CARBON NANOPARTICLES VERSUS FULLERENES IN FUNCTIONALIZATION BY ELECTRONIC POLYMERS FOR DIFFERENT OPTIONAL AND REDOX PROPERTIES</p> <p>Fan Yang, Xianyan Ren, Gregory E. LeCroy, Weixiong Liang, and Ya-Ping Sun</p>
54	<p>SURFACE CHARACTERISTICS OF PERFLUOROALKOXYL COPOLYMERS WITH TETRAFLUOROETHYLENE (TFE)</p> <p>Cassandra J. Hager, Cameron A. Parrish, Emory G. Burns, Andrej V. Matsnev, and Joseph S. Thrasher</p>
55	<p>OVERVIEW OF WETZLER GROUP RESEARCH</p> <p>Paris L. Hamilton, A. Kirstin Sockwell, Dani Y. Dong, Megan S. Sibley, Modi Wetzler</p>

POSTER NUMBER	POSTER TITLE
56	<p style="text-align: center;">GUANIDINIUM SULFATION CRYSTALLIZATION: STRATEGY FOR ENANTIOMERIC IDENTIFICATION</p> <p style="text-align: center;">Beau R. Brummel, Kinsey G. Lee, Colin D. McMillen, Joseph W. Kolis, and Daniel C. Whitehead</p>
57	<p style="text-align: center;">CONVENIENT SYNTHESIS OF Δ3-1,2-DIAZETINES, DIAMINES AND OXADIAZINONE DERIVATIVES</p> <p style="text-align: center;">Chandima J. Narangoda, Timothy R. Lex, Emma M. Frank, Colin D. McMillen, Madelyn A. Moore, Jillian Milanes, James Morris, and Daniel C. Whitehead</p>
58	<p style="text-align: center;">SELECTIVE NON-LETHAL SMALL MOLECULE INHIBITION OF BACTEROIDES SPECIES</p> <p style="text-align: center;">Anthony Santilli, Kerrick Rees, Kristi Whitehead, and Daniel Whitehead</p>
59	<p style="text-align: center;">A TARGETED DRUG DELIVERY STRATEGY FOR TRYPANOSOMIASIS</p> <p style="text-align: center;">Heeren M. Gordhan, Soham Panda, James Morris, and Daniel C. Whitehead</p>
60	<p style="text-align: center;">FUNCTIONAL PEPTIDES FOR ENANTIOSELECTIVE HYPERVALENT IODINE(III)-MEDIATED CHEMISTRY</p> <p style="text-align: center;">Maria I. Swasy, Timothy R. Lex, Monica L. Spritzky, and Daniel C. Whitehead</p>

