SUNDAY EVENING

3D Printing of Biomaterials and Drug Delivery

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by MEDI
A. Bandyopadhyay, S. Bose, *Organizers*

5:00 - 7:00

12. Nature meets science: Carvacrol aldehyde for bone regeneration. **A. Dahiya**, S. Bose

13. Quercetin-Zinc (II) complex loaded in 3D printed tricalcium phosphate for osteogenic and antitumorigenic treatment. **C. Toulou**

14. Indian gooseberry encapsulated liposomes for bone tissue engineering. **B. White**

15. Geometric optimization of polyvinyl alcohol microneedles for enhanced cutting performance. **A.J. Lefors**, S. Rahmani, P. Akbari, R. Chen

16. Withdrawn

17. Natural medicine release from 3D printed calcium phosphate scaffolds for bone tissue engineering. **U. Majumdar**, A. Dahiya, Y. Jo, P. Kushram, S. Bose

Advances in Actinide and Lanthanide Chemistry

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by NUCL
J. M. Boncella, X. Guo, *Organizers*
N. J. Henson, *Presiding*

5:00 - 7:00

18. Interrogating the Fe/U interface towards predictive models for environmental remediation. **B.A. Rooney-Sailand**, L.M. Moreau

19. Crystallographic and electronic structure of lanthanide-doped CeO_2 nanoparticles. **P. Jensen**

20. Investigation of thermal stabilities of mixed anion bearing Sodalites to study immobilization of radioisotopic chlorine and iodine. **K. Dahal**, S. Chong, D. Bollinger, N. Stone-Weiss, H. Zhong, B. Riley, S.P. Beckman, X. Guo, J. McCloy

Advances in Medicinal Chemistry

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by MEDI
C. E. Berkman, *Organizer*

5:00 - 7:00

21. Biocatalytic aza-Michael addition of aromatic amines to enone using α-amylase in water. **S. DUTT**

22. Optimizing procyanidin extraction from coffee pulp: A comparative study of microwave-assisted, ultrasound-assisted, and hybrid extraction methods. **M.B. Bamikale**, J.S. Cortés

23. Dimeric ATF compounds: Promising antibacterial agents. **C. Sprague**, K. Cornell

Advancing Chemistry through Computation and Artificial Intelligence

Compton Union Building
CUB Senior Ballroom (220)

R. Devanathan, *Organizer*

5:00 - 7:00

24. Authentication and contamination assessments of food products using a conformal prediction based consensus one-class classification. **H. Redd**, J.H. Kalivas

25. Computational modeling of plutonium oxide fate and transport. **M. DeSmet**, **L. Hubbard**, a. bautista, S. Muller, A. Nicholas, A. Casella, E. Buck, A. Williams, N.J. Henson, S. Miley, A. Carman

Biobased Materials and Products

Compton Union Building
CUB Senior Ballroom (220)

A. G. McDonald, *Organizer*

5:00 - 7:00

26. Investigating the effects of Alkali and Alkaline Earth Metallic (AAEM) species during biochar gasification of raw and treated samples in O_2 and H_2O mediums. **M. Arshad**

27. Influence of metakaolin and acetic acid on sodium silicate-based inorganic bonded wood composites. **A.M. Lehman-Chong**, M. Maughan, A.G. McDonald

28. Preliminary investigations on the thermal properties and flame retardancy of laccase grafted lignin micro/nanoparticles (LMNPs) on bamboo. **J. Tongco**, L. Cai

29. In situ biomineralization of metal phytates in pine wood for improved flame retardancy. **A. Farhabi**, L. Cai

30. Weathering performance of cardanol-based resin-treated wood. **L. Liang**, L. Cai, A.G. McDonald

31. Development and evaluation of an innovative mycelium-based bio-composite material for insulation applications. **E. Osei-Bonsu**, L. Cai

Biochemistry and Biomedicine/Cancer Biochemistry and Biology/Biomedical Engineering and Applications

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by MEDI
Financially supported by WSU E.S.F College of Medicine &

Office of Research
W. Li, *Organizer*

5:00 - 7:00

32. Dissecting the metabolic roles of lactate in breast cancer cell survival. **W.C. Hiscox**, W. Li

33. Investigating a potential protein-protein interaction between transcription factor PAX6 and Ribosomal Protein S20: Applications in Biochemistry and Biomedicines. **M. oladayo**, T. Kroll

34. Unveiling buried nerves with near-infrared fluorophores in fluorescence-guided surgery. **G. KUMAR**

35. Traceless phosphoryl mediated isopeptide crosslinking. **R.K. Ballard**, E. Savoy, C.E. Berkman

36. Withdrawn

37. [FeFe]-hydrogenase maturation: Refining the defined *in vitro* maturation. **A. Marlott**, B. Balci, A. Teye, A. Pagnier, E.M. Shepard, W.E. Broderick, J.B. Broderick

38. Synthesis of building blocks for novel DNA-targeting oligonucleotides. **T.J. Dohm**, **M. Rahman**, P.J. Hrdlicka

Breaking Borders and Building Bonds at Interfaces

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by COLL
J. Bell, *Organizer*

5:00 - 7:00

39. Surface chemistry and binding interactions of Lignin with Polymer-encapsulated gold nanoparticles acting as model microplastics. **O.A. AKINSOLA**, S.E. Lohse

40. Design, synthesis, and scale-up optimization of various peptide-based zwitterionic cross-linker species for incorporation into polyampholyte hydrogels. **S. Oneida**

Breaking Borders and Building Bonds in Chemical Biology

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by MEDI
T. T. Denton, A. Sharma, *Organizers*

5:00 - 7:00

41. Rapid Sensing of SARS-CoV-2 on GUITAR (pseudo-graphite). **M. Okeke**, D. Koirala, I.F. Cheng

42. Accelerated and scalable synthesis of mixed-layered glycodendrimers using copper-free click chemistry. **A. RANI**, V. Jain, A. Sharma

43. Hepatocytes-targeted silibinin nanoconjugate for the treatment of acute liver injury. **V. Jain**, A. Sharma, A. RANI

44. Targeted nanotherapy for the treatment of proliferative vitreoretinopathy. **S. GOPALAKRISHNAN**, A.I. Dar, A. RANI, K. Hsu, A. Szczesniak, M. Kelly, A. Sharma

45. Development of cannabinoid-dendrimer conjugate for efficient wound healing by localized controlled inflammation. **A.I. Dar**, A. RANI, S. Gopalakrishnan, A. Sharma

Breaking Borders and Building Bonds Through Catalysis

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by CATL
Q. Zhang, *Organizer*

5:00 - 7:00

46. Hydrogenation and dehydrogenation of N-heterocycles under Cp*Co (III)-catalysis. **P. Dahiya**, B. Sundararaju

47. Nickel-cobalt bimetallic phosphides as bifunctional electrocatalysts for electrochemical water splitting. **L. Zhu**, S. Yu, C.E. Umhey, H. Lin, J. McEwen, Q. Zhang, Y. Lin

48. Synthesis of Rh-Pd nanoparticles via neutron activation. **R.A. Adewale**, **L.M. Moreau**

Breaking Borders and Building Bonds Through Energy

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by ENFL
H. Zhao, *Organizer*

5:00 - 7:00

49. Synthesis of high aluminum content cubic ordered mesoporous silicates. **I. Joyce**, N.P. Stadie

Breaking Borders and Building Bonds Through Environmental Challenges

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by ENVR
J. Moberly, *Organizer*

5:00 - 7:00

50. Colorimetric sensor array: Rapid and sensitive approach for detecting emerging nanomaterial contaminants. **I. Ede**

51. Toxic chemicals in products: A policy approach. **S. Zigah**

Breaking Borders and Building Bonds Through Synthesis

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by CATL
W. D. Bailey, *Organizer*

5:00 - 7:00

52. Stereocontrolled synthesis of pharmaceutically pertinent 3-methylenetetrahydropyrans as potential antidiabetic agents. **I. Anosike**, T.K. Beng

53. Design, Development, and Synthesis of variable length zwitterionic crosslinkers for non-fouling polyampholyte hydrogels. **L. Dresler**, S. Oneida, K.V. Waynant

54. Synthesis of 2,*N*3-disubstituted 4(3*H*)-quinazolinones via *N*3-alkylation and C2-amination. **K. Kim**, M. Saroya, F. Gesinde

55. Withdrawn

Computational Chemistry: From Theory to Applications

Compton Union Building
CUB Senior Ballroom (220)

K. A. Peterson, *Organizer*

5:00 - 7:00

56. Relativistic ab initio calculations of the thermochemical properties of uranium oxides, sulfides, and selenides. **A. Hunt**, K.A. Peterson

57. Theory of integral and differential infinity: Applications on the atomic and nuclear scales. **D.W. Wester**

58. Molecular dynamics and docking simulations to predict inhibitors against zinc transporters (ZnT). **I. Batta**, G. Sharma

59. Direct air capture of CO_2 using amino-acid sorbents at oligomer decorated Air-aqueous interfaces. **N. Kumar**, U. Premadasa, B. Doughty, V. Bryantsev

60. Ion-ice reactions in astrochemical models. **K. Darnell**, D. Lopez-Sanders, C.N. Shingledecker

61. Synthesis and density functional theory investigation of gold deposition on silver for core-shell nanocubes with enhanced stability and sensing applications. **A. Oluwafemi**, Y. Bao, T. Kowalczyk

Creating and Breaking the Borders in Molecular Recognition

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by ANYL and COLL
G. Campillo-Alvarado, K. A. Wheeler, *Organizers*

5:00 - 7:00

62. Oriented growth of 2D metal-organic frameworks at solid-liquid interfaces. **S. Shin**, J. Tao, N. Canfield, M. Bowden, J. Heo, B. Sivakumar, L. Liu, D. Li, J. Liu, J. DeYoreo, P.K. Thallapally, M. Sushko

63. Impact of molecular shape on crystal assembly. **M. Dun**, K.A. Wheeler

64. Structural and spectroscopic characterization of Cu and Zn complexes supported by a tetradentate N_2S_2 ligand. **M. Kilker**

Electrochemistry

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by ANYL
I. F. Cheng, *Organizer*

5:00 - 7:00

65. Advancing solid electrolyte performance by protein as a dual-functional bridge for Li metal batteries. **C. Wang**, l. Ren, C. Ying, J. Liu, W. Zhong

66. Non precious metal phosphides and nitrides as HER and OER catalysts. **C. Umhey**, J. McEwen, L. Zhu, Y. Lin

Engineering Solutions for Environmental Chemistry Challenges

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by ENVR
J. Moberly, *Organizer*

5:00 - 7:00

67. Effective removal of antibiotics from aqueous solutions: Using deep eutectic solvent immobilized graphene oxide based adsorbents. **a. goyal**, E. Nashef

68. Bromine mediated tacticity modification: The effects of chemical environment and thermomechanical processing. **B. Bliss**, B. Zhao, W. Liu, J. Zhang

Integration of Thermal Catalysis and Electrocatalysis

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by CATL
Q. Chang, J. McEwen, *Organizers*

5:00 - 7:00

69. Development of High-yield Guerbet Alcohol over NiCuSn/MgAlO catalyst. **Y. Kwon**, M. Shao

70. Probing the TiO_2 surface through water and methanol adsorption. **C. Moore**, B.M. Moskowitz, J. McEwen, S. Raugei

391. Exploring the potential of electrogens in a microbial fuel cell-hydroponic system through multi omics approach. **K. Sharma**, C. Sato, S. Pradhan

Interfacial Chemistry Enables Sustainable and Resilient Infrastructure Materials

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by COLL
X. Shi, *Organizer*

5:00 - 7:00

71. Utilizing thermostable properties of GUITAR (pseudo-Graphite) for rapid and highly specific ssDNA generation. **J.A. Plascencia**, D. Koirala, I.F. Cheng

Materials in the Nuclear Fuel Cycle: From Cradle to Grave

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by NUCL
X. Guo, J. McCloy, *Organizers*

5:00 - 7:00

72. Iron sulfide nanoparticles for capturing volatile contaminants. **N. Shuvo**, J. Bussey, A.J. Lere-Adams, C. Dixon Wilkins, S. Karcher, J. McCloy

73. Molten salt synthesis of metal borides for nuclear waste forms. **E. Espinoza**, V. Augustine, A. Chemey

74. Investigation of the alkali and alkali-earth effect on crystallization of SnO_2 in LAW glasses for WTP. **A.J. Lere-Adams**, J. McCloy

75. In situ raman spectroscopy of Zr-Doped UO_2. **A. Totten**, S. Karcher, X. Guo, J. McCloy

76. 222-S Laboratory method development: Complexant analysis by high performance liquid chromatography. **T. Clauss**, E. Panisko, H. Anastos

Project SEED, REU's, and Partners in Science

Compton Union Building
CUB Senior Ballroom (220)

D. L. Warner, *Organizer*

5:00 - 7:00

77. N-Acyl homoserine lactone analogs as quorum sensing signal synthase modulators in B. japonicum. **L.B. Snow**, S. Jude, J. Abraham, M. Abrew, E.C. Brown, R. Nagarajan

Structures, Kinetics, and Thermodynamics at Interfaces

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by COLL
U. Mazur, *Organizer*

5:00 - 7:00

78. Heavy-atom tunneling in Cascade electrocyclizations in the biosynthesis of natural products. **I. Jain**, C. Castro, W.L. Karney

79. Effect of chain length on the physiochemical properties of perfluoroalkyl substances at the surface of water. **L. Jenkins**, J.D. Cyran

The Nucleus, Radiation, and Chemistry today

Compton Union Building
CUB Senior Ballroom (220)

Cosponsored by NUCL
A. Chemey, *Organizer*

5:00 - 7:00

80. Development of analysis codes for understanding element yields in nuclear fission. **L. Walker**, J. Olinger, A. Chemey

81. Design considerations for STARDUST, a nuclear fission scattering chamber. **J. Olinger**, L. Walker, A. Chemey

82. Design and building HPGe cooling array project. **J. Jaffe**, C. Jablonski, L. Walker, A. Chemey

83. D_2O box facility for higher-purity ^{135}Xe production at the Washington State University TRIGA Reactor. **M. Santillan**, D. Caballero, C. C. Hines

MONDAY MORNING

Geochemistry and Mineralogy of Critical Metal Elements

Smith Center for Undergraduate Excellence
CUE 418

Cosponsored by NUCL
X. Guo, J. Haemmerli, Z. Wang, X. Zhang, *Organizers*

8:05 Introductory Remarks .

8:10 84. Preparation of divalent Eu materials for thermodynamic study under hydrothermal conditions. **N.S. Yaw**, Y. Cortez, A. Migdisov, X. Guo

8:30 85. Incorporation of Ni and Zn affects the redox reactivity of goethite. **S. Mergelsberg**, D. Latta, M. Scherer, B. Popejoy, E.J. Bylaska, E.S. Ilton

9:10 86. Probing lanthanide structure and speciation with optical spectroscopy. **Z. Wang**

9:30 87. Large language model-based structured information retrieval and dataset construction: examples on rare earth mineral thermodynamic properties. **J. Liu**, H. Anderson, N. Waxman, D. Biehler, H. Pulivarthy, X. Guo

9:50 Morning Coffee/Snack Break.

10:20 88. Development of an internally consistent thermodynamic database for REE minerals and crystalline solids. **C. Zhu**, R. pan, R. Virk

11:00 89. Calorimetric and structural characterization of gamma irradiated rare earth rhabdophanes. **E.C. Kindall**, S. Bang, M. Reece, X. Guo

11:20 90. Availability and trends in thermodynamic data of solid rare earth element compounds with a specific focus on carbonate phases. **M. Scharrer**, G.A. Agbanga, B.L. Brugman, M. Guild, J. Liu, X. Guo, A. Navrotsky

3D Printing of Biomaterials and Drug Delivery

Smith Center for Undergraduate Excellence
CUE 219

Cosponsored by MEDI
A. Bandyopadhyay, S. Bose, *Organizers*

8:25 Introductory Remarks.

8:30 91. Development of biomimetic functional materials using sequence-defined peptoids. **C. Chen**

9:00 92. Precision biofabrication of complex calcified tissues and engineered cancer models in-vitro and ona-chip. **L. Bertassoni**

9:30 93. 3D-printed flexible microfluidic health monitors for in-situ sweat analysis and biomarker detection. C. Chen, Y. Fu, S. Sparks, Y. Lin, D. Du, **K. Qiu**

9:50 Morning Coffee/Snack Break.

10:20 94. Lipid nanoparticle-encapsulated gingerol on 3D-printed scaffolds for orthopedic applications. **B. White**, S. Bose, V. Chaudhari

10:40 95. Morphology and photoresponsive behavior of spiropyran-conjugated poly(N-isopropylacrylamide) and polyvinyl alcohol blend cryogel. **s. rahmani**, S. Simpson, A.J. Lefors, P. Akbari, R. Chen

11:00 96. Revolutionizing bone tissue engineering with botanical biomaterials. **A. Dahiya**, S. Bose

11:20 97. 3d-printed microprecise spatiotemporal delivery system for in situ tissue engineering of multi-tissue and their interfaces. **S. Tarafder**

Advancements and Training in Nuclear Materials Processing and Sensing in Harsh Environments

Smith Center for Undergraduate Excellence
CUE 419

Cosponsored by NUCL
S. D. Branch, H. Felmy, A. French, N. J. Henson, *Presiding*

8:25 Introductory Remarks.

8:30 98. Three decades of process monitoring applications directed toward the nuclear fuel cycle. **S.A. Bryan**, A. Lines, G. Nelson, J. Bello

9:10 99. Raman spectroscopic quantification of hydrogen isotopes using chemometric models applied across multiple systems. **H. Felmy**, R. Cox, A. Espley, E. Campbell, B. Kersten, H. Lackey, S.D. Branch, S.A. Bryan, A. Lines

9:30 100. Utilizing spectroscopic on-line monitoring to study the mass balance in a simulated TALSPEAK process. **P. Tse**, N.P. Bessen, A. Espley, H. Felmy, H. Lackey, R. Rodrigues, A. Parekh, S. Potter, G. Nelson, J. Allred, G.B. Hall, B. Seiner, G.J. Lumetta, S.A. Bryan, A. Lines

9:50 Morning Coffee/Snack Break.

10:20 101. Automated control of pH for a citric acid based TALSPEAK batch extraction process using real time Raman spectroscopy: chemometric model construction. **G.L. Nelson**, S. Potter, A. Espley, T. Serrano, P. Tse, S.A. Bryan, A. Lines

10:40 102. Utilizing Raman spectroscopy for industrial control in nuclear environments. **T. Serrano**, G.L. Nelson, S. Potter, A. Espley, P. Tse, N. Bessen, H. Felmy, J. Allred, K. Ross, S.A. Bryan, A. Lines

11:00 103. Raman spectroscopy-based process monitoring for real-time control of solution pH. **A. Espley**, S. Potter, G. Nelson, T. Serrano, P. Tse, S.A. Bryan, A. Lines

11:20 104. On-line monitoring of simulated Hanford waste streams in turbulent and laminar flow conditions with dual Raman probes. **N. Boily**, A. Schafer Medina, H. Felmy, S.A. Bryan, A. Lines

11:40 105. Raman fiber optic probe development for hazardous applications. **J. Bello**

Advancing Chemistry through Computation and Artificial Intelligence

Smith Center for Undergraduate Excellence
CUE 318

R. Devanathan, *Organizer*

8:25 Introductory Remarks.

8:30 112. ChemReasoner: Heuristic search over a large language model's knowledge space using quantum-chemical feedback. **S. Choudhury**

9:10 113. FoldX free energy prediction corrections using neural networks. **J. Barnes**, J. Suresh Patel, M. Ytreberg

9:30 114. HTModel: Using natural language processing model Molecular Transformer to predict hydrotreating reactions. S.C. Eswaran, L.N. Marrlett, R. Rallo, **M.V. Olarte**

9:50 Morning Coffee/Snack Break.

10:20 115. Use of relativistic composite methods for accurate thermochemistry of actinide-containing molecules. **K.A. Peterson**

11:00 116. Enhanced models for spent fuel with machine learning. **S. Muller**, M. Dinpajooh, M. LaCount, A.M. Ritzmann

Biochemistry and Biomedicine/Cancer Biochemistry and Biology/Biomedical Engineering and Applications

Smith Center for Undergraduate Excellence
CUE 319

Cosponsored by MEDI
Financially supported by WSU E.S.F College of Medicine & Office of Research
W. Li, *Organizer*

8:25 Introductory Remarks.

8:30 117. Designing podophyllotoxin-based inhibitors to combat Guanylate Binding Protein 1 (GBP1) derived treatment resistance in ovarian cancer. **S.V. Malhotra**

8:50 118. Quantitative proteomic analysis reveals unique Hsp90 cycle-dependent client interactions. **J.L. Johnson**, E. Rios

9:10 119. Nanotechnology-enhanced biosensors for biomedical and healthcare applications. **D. Du**

9:50 Morning Coffee/Snack Break.

10:20 120. Using directed evolution and rational protein design to create biomaterials to recapitulate angiogenesis. **M.H. Hettiaratchi**, J. Svendsen, C. Asnes, M. Ford

11:00 121. Fluorescence guided surgery can improve surgical outcomes. **L.G. Wang**

11:20 122. Fatty acid efflux in capacitated sperm. **T. Chauvin**, J. McAllister, P. Gaburak, C. Heflick, A. Tanggono

Chemical Theory and Mechanisms for Sustainable Energy Conversion and Production

Smith Center for Undergraduate Excellence
CUE 409

Cosponsored by ENFL
B. Liu, *Organizer*

8:25 Introductory Remarks.

8:30 123. Protonic ceramic electrochemical cells for power generation, H_2 production and CO_2 conversion. **F. LIU**

9:10 124. Theory and modeling of Sm-doped-CeO2-supported Ni-Ru bimetallic catalyst for dry and steam reforming of methane. **H. Deng**, F. Liu, C. Duan, B. Liu

9:30 125. Designing dual-site catalyst systems aided by kinetic modeling. **B. Liu**

9:50 Morning Coffee/Snack Break.

10:30 126. Ultrafast ligand planarization in metal-organic frameworks gates charge transfer: spectroscopy-guided rational design toward efficient photocatalysis. **L. Lancaster**, T. Krueger, E. Musa, K.C. Stylianou, C. Fang

10:50 127. Enhancing photoelectrochemical performance for water splitting through graphene composite materials. **Y. . Sirina**

Creating and Breaking the Borders in Molecular Recognition

Smith Center for Undergraduate Excellence
CUE 207

Cosponsored by ANYL and COLL
G. Campillo-Alvarado, K. A. Wheeler, *Organizers*

8:25 Introductory Remarks.

8:30 128. Halogen bonding with diarylhaloniums. **D.R. Stuart**

9:10 129. Structural and spectroscopic investigation of Oxo-bridged Fe^{III} and Co^{III} clusters supported by a tripodal hydroxyl-imine ligand. **K. Seabourn**, K.A. Wheeler, S. Stoian

9:30 130. Fluorination as a supramolecular switch: Directing boron coordination vs co-crystal

formation. **S. Agarwal**, J.D. Loya, G. Campillo-Alvarado, N.Z. Lutz

9:50 Morning Coffee/Snack Break.

10:20 131. Assessing the magnetic anisotropy of a series of Co(II) complexes with N4S2 coordination. **M. Idrees**, S. Stoian

10:40 132. Molecular confinement and separation using an adamantane based supramolecular architecture. **N. Lutz**, J. Bicknell, J.D. Loya, E.W. Reinheimer, G. Campillo-Alvarado

11:00 133. Supramolecular recognition of hydrocarbons using adamantanes: Applications in chemical separations. **G. Campillo-Alvarado**

Integration of Thermal Catalysis and Electrocatalysis

Smith Center for Undergraduate Excellence
CUE 407

Cosponsored by CATL
Q. Chang, J. McEwen, *Organizers*

8:25 Introductory Remarks.

8:30 134. Tandem electrocatalysis-thermocatalysis for CO_2 conversion. **J.G. Chen**

9:10 135. Trends and descriptors for electrochemical reduction of carbon dioxide to formic acid over Sn-based catalysts. **B. Wu**, X. Han, C. Wang, H. Lin, Q. Chang

9:30 136. Elucidating the effects of coverage on the adsorption of species on La-based perovskites. **A. Whitten**, J. McEwen, E. Nikolla, R. Denecke

9:50 Morning Coffee/Snack Break.

10:20 137. Interfacial quantum electric fields. **S. Kathmann**

10:40 138. Elucidating the influence of electric fields on Fe oxidation via multiscale models. **N. Cardwell**, S.V. Lambeets, I. Onyango, Y. Wang, T. Visart de Bocarme, D. Perea, J. McEwen

11:00 139. Field-assisted N_2 activation on Ru model nanoparticle imaged by Field Ion Microscopy and Operando Atom Probe. **S. Lambeets**, M. Wirth, S. Kathmann, D. Perea

11:20 140. Enhancing hydrogen production efficiency with caustic aqueous phase electrochemical reforming (CAPER) from organic-contaminated water. **S. Ha**, B. Kee

Project SEED, REU's, and Partners in Science

Smith Center for Undergraduate Excellence
CUE 209

D. L. Warner, *Organizer, Presiding*

8:25 Introductory Remarks.

8:30 141. Coordinating the Project SEED Program in the CA section. **E.S. Yamaguchi**

8:50 142. CLICKED: Chemical learning inspired by crystallographic knowledge, experiences, and discovery. **M. Jahnke**, O.B. Berryman, D. Decato

9:10 143. Cultural and academic research experience: Increasing cultural identity in STEM among high school students. **T. Zecher**, **K. Acothley**, K. Gustatson, J. Lee, **N. Lee**

9:30 144. Development of online engineering laboratories. **J. Crepeau**

9:50 Morning Coffee/Snack Break.

10:20 145. Project SEED at the University of Southern Mississippi. **D.S. Masterson**

10:40 146. Successes and impacts of organizing the ACS Project SEED Program at a primarily undergraduate institution. **A. Mallia**

11:00 147. Snake River Project SEED Site, Part 1: Program overview. **D.L. Warner**, H. Herring, L.B. Snow, C. Sprague

11:20 148. Snake River Project SEED Site, Part 2: Student experiences. **D.L. Warner**, H. Herring, L.B. Snow, C. Sprague

11:40 Panel Discussion.

MONDAY AFTERNOON

3D Printing of Biomaterials and Drug Delivery

Smith Center for Undergraduate Excellence
CUE 219

Cosponsored by MEDI
A. Bandyopadhyay, S. Bose, *Organizers*

1:35 Introductory Remarks.

1:40 149. Advancing tissue-biomaterial interfaces: From nanostructure modification to pathological tissue integration. **I. Mitra**, M. Astudillo Potes, L. Lu, B. Elder

2:10 150. Challenges and opportunities for the additive manufacturing of materials for dental applications. **S. Khajotia**

2:40 151. 3D printed tricalcium phosphate: Polycaprolactone biocomposite functionalized with quercetin enhances osteogenic, antitumorigenic, and antibacterial properties. **C. Toulou**

3:00 Afternoon Coffee/Snack Break.

3:30 152. Advancing fracture care: 3D-printed 17-4 PH stainless steel devices. **A. Dash**, A. Bandyopadhyay

3:50 153. Carvacrol and allicin release from HA-coated Ti64 enhances in vitro and in vivo biological properties. **U. Majumdar**, S. Bose

4:10 154. 3D Printed CoCrMo-3Cu alloy with hydroxyapatite for load-bearing articulating implants. **C.L. Orozco**, L. Upadhayay, A. Dash, N. Zuchschwerdt, A. Bandyopadhyay

4:30 155. Machine learning enabled design and optimization for 3D-printing of high-fidelity presurgical organ models. E. Chen, A. Alaleh, S. Sparks, A. Deshwal, J. Doppa, **K. Qiu**

Advancements and Training in Nuclear Materials Processing and Sensing in Harsh Environments

Smith Center for Undergraduate Excellence
CUE 419

Cosponsored by NUCL

1:35 Introductory Remarks.

1:40 366. Advancing freshwater monitoring: Artificial mussels with Chelex-100 for uranium detection. **L.R. Lewis**, M.K. Murphy, A. Chemey

2:00 369. Image analysis of particulate debris laced with luminescent tracers. **L. Hubbard**, a. bautista, M. DeSmet, S. Muller, S. Milley, C. Reed, A. Nicholas, A. Williams, A. Casella, A. Carman

2:20 373. Optical spectroscopic sensor fusion on a microfluidic device for lanthanide quantification. **H. Lackey**, A. Espley, F. Lamadie, G. Nelson, M. Miguirditchian, S. Potter, S.A. Bryan, A. Lines

2:40 370. Refining luminescent tungsten oxide particles as a model tracer of plutonium oxide transport. a. bautista, **L. Hubbard**, M. DeSmet, A. Nicholas, A. Casella, E. Buck, A. Williams, N.J. Henson, S. Muller, S. Miley, A.J. Carman

3:00 Afternoon Coffee/Snack Break.

3:30 372. Exploring complex molten salt chemistry through chemimetric analysis. **S.D. Branch**, J.M. Rakos, S. Choi, H. Felmy, A. Schafer Medina, S.A. Bryan, A. Lines

3:50 368. ICP-MS/MS analyses for improved measurements in nuclear forensics. **A. French**, K. Hobbs, I. Arnquist, K. Harouaka, C.L. Beck, S. Scott

Biochemistry and Biomedicine/Cancer Biochemistry and Biology/Biomedical Engineering and Applications

Smith Center for Undergraduate Excellence
CUE 319

Cosponsored by MEDI
Financially supported by WSU E.S.F College of Medicine & Office of Research
W. Li, *Organizer*

1:35 Introductory Remarks.

1:40 156. Anticancer activity of some organoplatinum(IV) complexes. **W.A. Howard**, A. Arabi, S. Stitz, M. Cogley, A. O'Brien, D. Fabrizio, K.A. Wheeler

2:00 157. Filament assembly of human PRPP synthetase 1 stabilizes allosteric sites to regulate activity. **K. Hvorecny**, K. Hargett, J. Quispe, J. Kollman

2:20 158. Biomimetic self-powered triboelectric nano-generator integrated silicone e-skin for real-time postural feedback in amputee rehabilitation. **M. Haider**, M. Wasif

2:40 159. Predicting the effects of point mutations on the affinity of a peptide-peptide complex by molecular dynamics simulations and end-point free energy binding calculations. **G. Smith**, E.J. Sanchez, A.S. Kostyukova

3:00 Afternoon Coffee/Snack Break.

3:30 160. Sequence-unrestricted recognition of double-stranded DNA by chimeric LNA-Invader probes. **M. Everly**, P.J. Hrdlicka

3:50 161. Near infrared fluorescent probes for fluorescence guided prostatectomy. **G. Malankar**, D. Szafran, G. KUMAR, A.M. Masillati, A.R. Montaño, L.G. Wang, S.L. Gibbs

4:10 162. Modeling tumor microenvironment with native tissue matrix: structure, biology, and metabolism. **W. Li**

Breaking Borders and Building Bonds Through Catalysis

Smith Center for Undergraduate Excellence
CUE 407

Cosponsored by CATL
Q. Zhang, *Organizer*

1:35 Introductory Remarks.

1:40 163. H-D exchange of aromatic compounds using ruthenium complexes bearing PNP ligands. **N. Fisher**, D. Culver, J.M. Boncella

2:00 164. Metal-coordinated phthalocyanines as platform molecules for understanding isolated metal sites in electrochemical reduction of CO_2. **Q. Chang**, J. Lee, S. Kattel, J.G. Chen

2:40 165. Advancing click chemistry: An efficient, green one-pot synthesis of triazole derivatives using atomically dispersed copper catalysts in azide-alkyne reactions under mild conditions. **A. Auni**, Q. Zhang

3:00 Afternoon Coffee/Snack Break.

3:30 166. Developing a scalable catalytic process for the cyclization and dehydrogenation of botanical cannabidiol to form cannabinol. **R. Jensen**

3:50 167. Boosting photocatalytic hydrogen production by MOF-derived metal oxide heterojunctions achieving a 10.0% apparent quantum yield. **E.N. Musa**

4:10 168. Breaking borders: The creation and catalytic innovations of hierarchical porous UiO-66 MOFs. **Q. Zhang**

Breaking Borders and Building Bonds Through Chemistry in the Community

Smith Center for Undergraduate Excellence
CUE 209

A. N. Lamm, *Organizer*

1:35 Introductory Remarks.

1:40 1. Chemistry outreach in South Sound region: Engaging activities for K-12 students. **S. Arungundram**, **A. Hoffman**

2:00 2. Chemistry outreach at Eastern Washington University. **A.N. Lamm**

2:20 3. Aromatic potential of hop polyfunctional thiols. **C. Chenot**, S. Collin

Computation in Molecular Sciences

Smith Center for Undergraduate Excellence
CUE 318

J. Patel, M. Ytreberg, *Organizers*

1:35 Introductory Remarks.

1:40 169. Use of structure-guided drug discovery for development of novel antibacterial medicines. **A. Baylink**

2:20 170. Exploring the ability of the MD+FoldX method to predict SARS-CoV-2 antibody escape mutations using large-scale data. **L. Chi Uluac**, J. Barnes, J. Suresh Patel, M. Ytreberg

2:40 171. Using structure prediction to predict mechanisms and families in *S. cerevisiae* Killer toxins. **J. Creagh-Grave**

3:00 Afternoon Coffee/Snack Break.

3:30 172. Unleashed from constrained optimization: Quantum computing for quantum chemistry employing generator coordinate method. **B. Peng**

3:50 173. Visual languages in VR to explore chemical spaces. **J. Peper**, J.H. Kalivas

4:10 174. The MifS/MifR signal transduction system links central metabolism with virulence in Pseudomonas aeruginosa. **Z. Sarwar**

Interfacial Chemistry Enables Sustainable and Resilient Infrastructure Materials

Smith Center for Undergraduate Excellence
CUE 207

Cosponsored by COLL
X. Shi, *Organizer*

1:35 Introductory Remarks.

1:40 175. Application of polyvinyl alcohol (PVA) polymer to produce Zn-hydrogel anode in providing cathodic protection for rebars in salt-contaminated concrete. Z. Zhou, **X. Shi**

2:00 176. Interfacial bond strength of nanoclay-modified epoxy resin for CFRP-mortar composites. **A. Ali Shahmansouri**, X. Shi

2:20 177. Cost-effective and durable concrete with nano-modified aggregates pretreated by graphene oxide. **J. He**, X. Shi

3:00 Afternoon Coffee/Snack Break.

3:30 178. Catalyst-free, degradable, amine cured epoxy network vitrimer: Robust mechanical performance, 100% hydrothermal recyclability in pure water. **L. Shao**, J. Zhang

3:50 179. Micro-/nano-engineered epoxy-coated rebar to increase concrete durability in harsh environments: anticorrosion and bond performances. **A. Mahmoodigahrouei**, X. Shi

4:10 180. Recycled mask polypropylene microfibers benefit tensile properties and prevent

thermally induced spalling of high-strength engineered cementitious composite. **X. Shi**, Z. Zhang

The Nucleus, Radiation, and Chemistry Today

Smith Center for Undergraduate Excellence
CUE 418

Cosponsored by NUCL
A. Chemey, *Organizer*

1:35 Introductory Remarks.

1:40 181. Nuclear chemistry: An essential nuclear science. **A. Chemey**

2:00 182. Unveiling the chemistry of superheavy elements: insights and challenges. **J.M. Gates**

2:40 183. Use of mixed resin system for separation of actinides and long-lived fission products. **C. Allen**, S. Herman, E. Arnold, A. French, C.L. Beck

3:00 Afternoon Coffee/Snack Break.

3:30 185. Investigation of candidates for reactor produced radioactive materials in support of radiological training exercises. **Z.M. Heiden**, C.C. Hines, N.R. Mann

3:50 186. Overview of fusion commercialization in the pacific NW. **C. Keane**

4:10 184. Future mass measurement capabilities at Berkeley Lab's FIONA. **R. Orford**

Unlocking a Sustainable Future: Harnessing the Power of the Hydrogen and Beyond

Smith Center for Undergraduate Excellence
CUE 409

Cosponsored by ENFL
A. Wilson, H. Zhao, *Organizers*

1:35 Introductory Remarks.

1:40 187. Advanced solid oxide electrolysis cell (SOEC) technology for H2 production at Idaho National Laboratory. **D. Ding**

2:20 188. Synergizing direct air capture and utilization of CO2 for energy system decarbonization. **H. Lin**, C. Wang, Z. Dong

3:00 Afternoon Coffee/Snack Break.

3:30 189. [FeFe]-Hydrogenase maturation: DTMA ligand biosynthesis and the role of HydF maturase. **B. Balci**, R. O'Neill, A. Marlott, E.M. Shepard, h. yang, A. Pagnier, M.T. Mock, B.M. Hoffman, W.E. Broderick, J.B. Broderick

3:50 190. $SrIrO_3$ as efficient electrocatalysts for hydrogen production in proton exchange membrane electrolyzer. **Z. Feng**

4:30 191. Effect of a-site deficiency on the performance of PrNi0.7Co0.3O3-δ perovskite materials for protonic ceramic electrochemical cells. **H. Zhao**, D. Ding, W. Bian, T. Li

TUESDAY MORNING

Advances in Actinide and Lanthanide Chemistry

Smith Center for Undergraduate Excellence
CUE 419

Cosponsored by NUCL
J. M. Boncella, X. Guo, N. J. Henson, *Presiding*

8:25 Introductory Remarks.

8:30 192. Elucidating the growth pathways and periodic trends of actinide oxide nanoparticle formation. **W. Vance**

8:50 193. Solvent directed anisotropic growth of uranium dioxide nanoparticles. **C. Wentzell**

9:10 194. Solid state ^{59}Co NMR study of a high-valent Np complex: : $[Co(NH_3)_6]_3[NpO_4(OH)_2]_3.nH_2O$. **K. ANAND**, K. Rana, S. Park, S.I. Sinkov, G.C. benthin, H. Rajapaksha, T. Forbes, H. Cho

9:30 195. Reactivity of actinide complexes supported by meso-$[ONO]^{2-}$, products arising from a template synthesis. **A.M. Tondreau**

9:50 Morning Coffee/Snack Break.

10:20 196. Synthesis of a trivalent uranium Monoimido and the role of potassium intercalation in stabilizing this reactive moiety. **E.D. Reinhart**, C. Studvick, B. Billow, J.M. Boncella, I.A. Popov, A.L. Odom

10:40 197. Stabilizing low-valent organouranium complexes using bulky terphenyl amido ligands. **V. Groner**, E.D. Reinhart, J.M. Boncella

11:00 198. Investigating the formation and reactivity of Zr^{II}, Hf^{II}, and An^{II} species supported by metal-arene interactions. **I. Haltom**, J.M. Boncella, E. Reinhart

11:20 199. Stabilization of high- and low-valent f-element complexes: Computational rationale. **I.A. Popov**, J.M. Boncella, H.S. La Pierre, B. Vlaisavljevich, A.M. Tondreau, E.D. Reinhart, P. Yang, E.R. Batista

Advances in Medicinal Chemistry

Smith Center for Undergraduate Excellence
CUE 319

Cosponsored by MEDI
C. E. Berkman, *Organizer*

8:25 Introductory Remarks.

8:30 206. An efficient synthesis of C-6 aminated 3-bromoimidazo[1,2-b]pyridazines. **T. Iorkula Hange**, B. Tolman, S. Burt, M. Peterson

8:50 207. An isoxazole conformational scan: towards bioisosteric replacement in design of PDZ domain inhibitors. **C.A. Gates**, N.R. Natale

9:10 208. Inhibition of oxytosis/ferroptosis as a tool for identifying neuroprotective phytocannabinoids. **R. Jensen**, P. Maher

9:30 209. The natural products magnetic resonance database (NP-MRD): comprehensive resource for NMR data enabling natural products discovery and understanding. **J.R. Cort**

Biobased Materials and Products

Smith Center for Undergraduate Excellence
CUE 416

A. G. McDonald, *Organizer*

8:25 Introductory Remarks.

8:30 210. Development of wood fiber reinforced biodegradable PHB-based toughening materials. Z. Chen, **H. Li**

8:50 211. Carbonized hemp fiber for use in composites materials. **S.B. Yusuf**, A.G. McDonald

9:10 212. Solvent-assisted plastic recovery from mixed municipal solid waste. **H. Appiah**, A.G. McDonald, J. Klinger, E.B. Ziv

9:30 213. Biobased novolac composites: Flow, curing, and mechanical properties. **J. Kukal**, A.G. McDonald, L. Portilla, B. Via, S. Adhikari

9:50 Morning Coffee/Snack Break.

10:20 214. Preparation and characterization of lignin-polybutylene-succinate copolymers. **N. Ewurum**, A.G. McDonald

10:40 215. Enhancement of rheology and thermal stability of PHBV fed fermented dairy manure blended with polylactic acid by *in-situ* reactive extrusion. **M. Abbasi**, A.G. McDonald

11:00 216. Wood protection properties of Zinc Oxide-based Cement complex from Clove oil and wood pyrolysis oil. **C. Alorbu**, A.G. McDonald, L. Cai

11:20 217. Artificial weathering performance of wood coated with bio-oils. **D. Willard**, L. Cai, A.G. McDonald

11:40 218. Thermoforming natural fiber prepregs into laminated structures. **A. Chanda**, M.B. Bakri, V. Yadama

Electrochemistry

Cosponsored by ANYL
I. F. Cheng, *Organizer*

Smith Center for Undergraduate Excellence
CUE 207

8:25 Introductory Remarks.

8:30 219. Exploring the lower limit of electrorefining. **J.H. Manner**, M. Stoddard, D. Rappleye

8:50 220. GUITAR: A highly modifiable carbon thin film for catalytic applications. **F. Dalbec**, D. Koirala, J.A. Plascencia, I.F. Cheng

9:10 221. Soy protein-enhanced cathode with graphene coating for high-performance Li-S batteries. **Y. Guo**, C. Ying, l. Ren, C. Wang, J. Liu, W. Zhong

9:30 222. Corn protein-functionalized separator for trapping polysulfides and regulating ion transport in Li-S batteries. **L. Ren**, C. Wang, Y. Guo, J. Liu, W. Zhong

9:50 Morning Coffee/Snack Break.

10:20 223. Single-atom catalysts for enhanced electrochemical applications: Fuel cells and CO2 conversion. **Y. Lin**

10:40 224. Chemical and radiation effects from Hanford tank waste on long-term performance of Ag/AgCl reference electrodes for in-tank corrosion potential monitoring. **S.X. Feng**, D. Frye

11:00 225. Exploration of chemical and thermal stability of c-LLZO using in situ Raman microscopy. **S.T. Montoya**, S. Shanto, R.A. Walker

11:20 226. Economical Zr & Ti electroplating at low-throughput commercial scales. **C. Arendt**, **L. Hubbard**, K. Grubel, C. Chancellor, S. Livers, B. Lawler, M. di Vacri

Exploring the Chemistry of Next-Generation Coolants and Solvents: Interfacial Processes Under Extreme Environments

Smith Center for Undergraduate Excellence
CUE 409

Cosponsored by ENFL and NUCL
S. Gill, *Organizer*

8:25 Introductory Remarks.

8:30 227. Disentangling simultaneous effects of corrosion and irradiation of structural materials in molten salts and liquid metals. **M.P. Short**, A. Peterkin, W. Zhou, W. Cairang, K. Woller, Y. Yang, A. Minor, R. Moeykens, G. Zheng

9:00 228. Strategies for characterizing the impact of fission environmental factors on the interfacial molten salt corrosion mechanisms of Ni-based reactor structural materials. **T. Copeland-Johnson**, X. Quintana, I. Han, F. Teng, M.E. Woods, R. Gakhar, D. Murray, G. Cao, G. Holmbeck, S. Gill, J. Tucker, L. He

9:20 229. Chloride-induced stress corrosion cracking in stainless steels: Mechanisms and mitigation. **J. Wharry**, H.J. Qu

9:50 Morning Coffee/Snack Break.

10:20 230. Perspectives on the interfacial interactions between U-Zr fuel and cladding. **M. Okuniewski**, N. Rodríguez Pérez, J. Thomas, M. Smith, A. Figueroa Bengoa

10:50 231. Fission products, actinides, and other things that are depositing, diffusing, and plating onto materials in molten salt systems. **S.S. Raiman**

Materials in the Nuclear Fuel Cycle: From Cradle to Grave

Smith Center for Undergraduate Excellence
CUE 418

Cosponsored by NUCL
X. Guo, J. McCloy, *Organizers*

8:25 Introductory Remarks.

8:30 237. Ab initio molecular dynamics informed EXAFS of some F-block elements associated with ancient and synthetic Fe oxides. **E.S. Ilton**, S. Mergelsberg, E.J. Bylaska, J.G. Catalano

9:10 232. Thermal expansion of uranium mononitride. **N.S. Yaw**, E. Kindall, A. van Veelen, S. Karcher, B. Merrill, C. Dixon Wilkins, G. King, j. white, J. McCloy, X. Guo

9:30 235. Analysis of the structural polymorphism of thorutite, $ThTi_2O_6$, and related materials. **M.C. Dixon Wilkins**, N.S. Yaw, X. Guo, J. McCloy, N.C. Hyatt

9:50 Morning Coffee/Snack Break.

10:20 238. Leach test diffusivity parameters accuracy for cementitious waste forms models. **A. Fujii Yamagata**, R. Skeen, G. Smith, R.M. Asmussen

10:40 236. Dissolution of doped UO_2 using single pass flow through studies. **S. Asmussen**, R.M. Asmussen, A.P. Goulet, R.W. Shimskey, B.D. Hanson

11:00 . The xenon-metal pair formation in UO2: A DFT+U study. **L. Malakkal**, S. Zhou, V. Prithivirajan, C. Howard, D. Yushu, L. He, S. Biswas

11:20 234. Thermal conductivity of nuclear fuels and materials, before and after irradiation. **Z. Hua**, A. Khanolkar, C. Dennett, K. Gofryk, M. Manley, M. Khafizov, D. Hurley

11:40 . Initial results in molten salt synthesis of f-element nitrides. **V. Augustine**, E.A. Espinoza, S. Parker, A. Chemey

Pushing the Boundaries of Sensitivity

Smith Center for Undergraduate Excellence
CUE 209

Cosponsored by ANYL
Financially supported by Shimadzu
C. Gobrogge, *Organizer*

8:25 Introductory Remarks.

8:30 247. Building a better microscope for imaging mass spectrometry sensitivity. **B.**

Bogdanov, **B. Feild**, C.A. Gobrogge

8:50 248. Sensitive measurement of steroids, small molecules, and peptides by LC-MS/MS. **D.W. Erikson**

9:10 249. PFAS trailhead: A path to testing. **D. Gruszecka**

9:30 250. PFAS - They are here, now what?. **E.T. Linskey**

Structures, Kinetics, and Thermodynamics at Interfaces

Smith Center for Undergraduate Excellence
CUE 219

Cosponsored by COLL
U. Mazur, *Organizer*
J. A. Brozik, *Presiding*

8:25 Introductory Remarks.

8:30 251. Stochastic interactions of long- and short-form aquaporin-4 in supported lipid bilayers. **J.A. Brozik**, J.D. Carder, B. Barile, K. Shisler, F. Pisani, A. Frigeri, K. Hipps, G. Nicchia

9:10 252. Thermal effusivity measurement using modulated temperture differential scanning calorimetry. **R. Blaine**

9:30 253. Functionalized Liquid-Solid Interfaces for Ion Separations. **G.E. Johnson**

9:50 Morning Coffee/Snack Break.

10:20 254. Imaging kinetics and ion uptake in organic mixed ionic-electronic conductors. **R. Giridharagopal**, D.S. Ginger

11:00 255. Photophysics and chemistry of group XIV rhodamines. **F. Abounorinejad**, E.L. Taylor, E.P. Jacobo, J.A. Brozik

11:20 256. Withdrawn

The Chemistry of Historical Archaeology

Smith Center for Undergraduate Excellence
CUE 318

R. Von Wandruszka, *Organizer*

8:25 Introductory Remarks.

8:30 262. Analytical chemistry in historical archaeology. **R. Von Wandruszka**

8:50 263. From yellow powder to black powder: An archaeochemical journey. **M. LaFleur**, R. Von Wandruszka

9:10 264. Arsenic for health and beauty. **C. Qualls**, R. Von Wandruszka

9:30 265. Snake oils and witch bottles in our past. **E. Wilcoxson**, R. Von Wandruszka

9:50 Morning Coffee/Snack Break.

10:20 266. Historical laxatives. **C. Young**, R. Von Wandruszka

10:40 267. Chemical sleuthing in historical archaeology. **R. Von Wandruszka**, M. Moody

11:00 268. Digging chemistry. **A. Hoffman**

Breaking Borders and Building Bonds in Chemical Biology

Smith Center for Undergraduate Excellence
CUE 319

Cosponsored by MEDI
T. T. Denton, A. Sharma, *Organizers*

10:20 Introductory Remarks.

10:25 269. Characterisation of phospholamban phosphorylation in response to β1-adrenoceptor stimulation in cardiac H9C2 myocytes. **N.U. Anyiam**

10:45 270. Design and synthesis of a platelet activating factor activity-based probe. **J. Kroll**, D. Kim, V. Lin

11:05 271. Investigating lncRNA structure and dynamics with single-molecule fluorescence microscopy. **K. Pai**, J.R. Widom

11:25 272. Sequence-unrestricted DNA-targeting using Invader probes. **P.J. Hrdlicka**

11:45 273. Pre-clinical evaluation of phosphonate analogues of lanthionine ketenamine as potential therapies for neurological disorders. **T.T. Denton**

TUESDAY AFTERNOON

Undergraduate Research

Compton Union Building
CUB Junior Ballroom (210)

P. Buckley, J. Lessmann, *Organizers*

12:00 - 1:30

280. Zeolite catalyzed Friedel-Crafts acylations. J. Tzompa, **A. Hayden**, **S. Call**, I. Marshall, L.A. Nickerson

281. Green synthesis of MOF materials. **K. Younce**, F. Hou

282. Synthesis and characterization of ruthenium pincer complexes. **J. Carrell**, N. Fisher, J.M. Boncella

283. Pulsed source ion mobility spectrometry. **L. Vyhmeister**, S. Gharari, A. Robb, B. Clowers, E. Davis

284. Synthetic preparation of modified compounds for fluorescent click labeling of cysteinylated tRNA. **T. Le**, L.A. Nickerson, C.M. Evilia

285. Maximizing with MOF catalysts: Testing for optimal yield conditions of one-step phenol synthesis. **Z. Irvine**, F. Hou

286. Improved solid phase extraction method for quantifying thiamine in fish tissues. **E. Boyd-Tucker**, L.A. Hoferkamp, C. Pinger

287. Incorporation of transition metals into CeO2 and UO2. **M. Lauby**, P. Jensen, S. Scheel, L.M. Moreau

288. Interanionic interactions in aluimno-boro-silicate nuclear waste glasses. **J. Bussey**, A. Azeddioui, N. Smith-Gray, N. Stone-Weiss, D. Neuville, S. Karcher, C. Dixon Wilkins, J. McCloy

289. CuCo catalysts derived from decomposed CuCo-MOF materials for selective CO_2 hydrogenation to methanol. **B. Li**, C. Wang, H. Lin

290. Deciphering LARP6-mediated collagen mRNA stability via FRET: implications for targeted fibroproliferative disease therapies. **H. Herring**, E. Baggs, L. Warner

291. Increasing the safety of irradiated samples with nitrogen. **L. Lumzer**, Z.M. Heiden

292. Investigating the trace metal analysis in Sharpie markers. **A. Smith**, **E. Irish**, Z.M. Heiden

293. PSMA-targeted dendrimer nanomedicine for prostate cancer. **K.J. Goody**

294. Protic NNN pincer complexes as homogeneous CO_2 reduction catalysts. **S.G. von Fuchs**, J. Smith, S. Dillinger, W.D. Bailey

295. Investigation of lewis acid catalysts to aid the synthesis of substituted chalcones. **H.M. Gray**, L. Wang, W.D. Bailey

296. Hydrolysis kinetics of trimeric Benzodiazaborole. **M.A. Lamb**

297. Salmonella and the microbiome: How metabolism plays a role in competition. **S. Diaz De Leon**, A. Baylink

298. Pulsed electrospray ionization kinetics. **G. Valdez**, L. Vyhmeister, R. Mcrae, T. Masiello, E. Davis

299. Synthesis and Reactivity of Zr, Hf, Th, and U Complexes. **M. Litwin**, J.M. Boncella

300. Scandium dissolution in alkaline carbonate media. **O. Bahhage**, X. Guo

301. Investigation of trace metals in packaging materials for nuclear reactor irradiations. **M. McCloy**, **G. McCloy**, Z.M. Heiden

302. Advancing molten salt reactor technology. **B. Iyer**, X. Guo

Breaking Borders and Building Bonds Through Environmental Challenges

Smith Center for Undergraduate Excellence
CUE 207

Cosponsored by ENVR
J. Moberly, *Organizer*

1:35 Introductory Remarks.

1:40 307. High-valent metal species in water splitting and abatement of micropollutants in water. **V.K. Sharma**

2:00 308. Withdrawn

2:20 309. Towards optimizing biobeads for improved bioremediation of trichloroethylene. **C. Silsby**, J. Moberly

Computational Chemistry: From Theory to Applications

Smith Center for Undergraduate Excellence
CUE 318

K. A. Peterson, *Organizer*

1:35 Introductory Remarks.

1:40 310. The many-body expansion in science. **S. Xantheas**

2:20 311. Consequences of the Kirkwood transition: from separations to sludge. **G.K. Schenter**

2:40 312. Exploring the chemical behavior of water within enzymes using spatial and electrostatic computation. **C. Sindic**, P.R. Callis

3:00 Ice Cream Social.

3:30 313. Simulating excited states and interlayer coupling for photoactive and electroactive covalent organic framework design. T. Leo, N. Kanlayakan, M. Robbins, A. Sullivan, H. Abbay, H. Thornes, G. Fitzsimmons, A. Goodey, **T. Kowalczyk**

3:50 314. Over-destabilization vs. over-stabilization in theoretical analysis of f-orbital covalency. **X. Li**

4:30 315. Application of auxiliary field quantum Monte Carlo to actinide thermochemistry. **B. Bonar**

Creativity in Metal-Ligand Bonding

Smith Center for Undergraduate Excellence
CUE 416

R. R. Thompson, *Organizer*

1:35 Introductory Remarks.

1:40 4. Recent development in the evolution of pop-based ligands for the construction of electrophilic transition metal systems. **E.B. Hulley**, K. Chavez

2:00 5. Engineering a new stable and luminescent zirconium metal-organic framework using a lowered-symmetry tetraphenylethene-based ligand, meta-ETTC. **H. Johnson**, E.S. Garcia, M. Ebberson, Q. Zhang

2:20 6. Synthesis of Azothioformamide and Azoformamide ligands: Application from coordination to catalysis and biological activity. **L. Tiwari**, K.V. Waynant, K. Cornell

2:40 7. Designing ligands for metal dissolution. **K.V. Waynant**, J. Moberly, M.F. Roll, L. Tiwari, R. pradhan, M. Moody

3:00 Ice Cream Social.

3:30 8. Diverse reactivity of a nickel-phosphaethynolate. **R.R. Thompson**, D. Powers, O. Gutierrez

3:50 9. Sequential pore functionalization of metal-organic framework for carbon dioxide capture. **A. Yadav**, K.C. Stylianou

4:10 10. Synthesis, characterization, and reactivity of thioether-supported amido complexes of iron and cobalt. **R.D. ONeill**, C. Pollock, M. Mosquera, M.T. Mock

4:30 11. High-valent mononuclear nickel complexes: From C-H bond activation to water splitting catalysis. **D. Wang**, Y. Kwon, C. Bruner

Emerging Technologies for Targeted and Controlled Drug Delivery

Smith Center for Undergraduate Excellence
CUE 319

Cosponsored by MEDI
A. Sharma, *Organizer*

1:35 Introductory Remarks.

1:40 316. 2-Deoxy glucose surfaced mixed layer dendrimer-based non-invasive neuron-targeted drug delivery system. **A. Dhull**, Z. Zhang, A. Sharma, R. Sharma

2:00 317. Modular SMART molecules for targeted drug delivery. **E. Savoy**, F.P. Olatunji, R.K. Ballard, C. Lovingier, M. Fulton, C.E. Berkman

2:20 318. Hydrogels and micellar structures for controlled drug delivery and as liquid embolics. **H. Ghandehari**

3:00 Ice Cream Social.

3:30 319. Dynamic borders: A study of interfacial phenomena in lipid nanoparticle systems. **Y. Eygeris**, G. Sahay

3:50 320. Re-discovering tumor-targeted glutamine antagonists using prodrug paradigms. **R. Rais**

Exploring the Chemistry of Next-Generation Coolants and Solvents: Radiation-Induced Chemistry

Smith Center for Undergraduate Excellence
CUE 409

Cosponsored by ENFL and NUCL
G. Holmbeck, *Organizer*

1:35 Introductory Remarks.

1:35 321. Influence of proton irradiation on the corrosivity of molten fluoride salt. **W. Zhou**, A. Peterkin, R. Moeykens, K. Woller, M.P. Short, G. Zheng, Y. Yang

2:00 322. Understanding the effects of gamma radiation on the chemical and physical characteristics of a potential candidate for organic cooled reactors. **A. Vasquez**, A. Seshadri, K. Shirvan, J. Buongiorno

2:30 323. Radiation-induced transients in solid and molten Li and K iodides. **A. Ramos Ballesteros**, G. Holmbeck, R. Gakhar, M.E. Woods, J.K. Conrad

3:00 Ice Cream Social.

3:30 324. Dynamics and reactivity of electrons in aliphatic ionic liquids. **C. Huber**, A.T. Healy, J.F. Wishart, D.A. Blank

3:55 325. Investigating the impacts of used nuclear fuel direct dissolution of on the radiolytic longevity of solvent and butyramide extractants. **S.P. Mezyk**, A. Dang, A. Kynman, G. Holmbeck

Advances in Actinide and Lanthanide Chemistry

Smith Center for Undergraduate Excellence
CUE 419

Cosponsored by NUCL

1:55 Introductory Remarks.

2:00 367. Towards a molecular-based understanding of extraction with Diamyl amyl phosphonate. **M. Dinpajooh**, R. Overstreet, A.M. Ritzmann, L.A. Metz, N. Uhnak

2:20 371. Bonding, reactivity, and mechanisms of stabilization of low valent uranium-arene complexes: a computational rationale. **C. Studvick**, E. Reinhart, A.M. Tondreau, B. Billow, A.L. Odom, J.M. Boncella, I.A. Popov

2:40 375. ^{79}Br and ^{81}Br Nuclear Quadrupole resonance study of the electronic structure and bonding in $Cs_2UO_2Br_4$. S. Park, **K. Rana**, K. ANAND, R.G. Surbella, S.I. Sinkov, H. Cho

3:00 Ice Cream Social.

3:30 376. Mausolates: large-cavity chelates for lanthanide and heavy metal ion binding. J.F. Smart, A.J. Ackroyd, A.T. Gogoulis, L. Gajecki, A.G. Oliver, J.S. McIndoe, **D.J. Berg**

3:50 377. Calculation of reaction rate for dinitrogen pentaoxide using ab initio molecular dynamics. **M. LaCount**, N.J. Henson, A.M. Ritzmann

4:10 379. Uranyl uptake into metal–organic frameworks: A detailed X-ray structural analysis. **M.P. Heaney**, H. Johnson, J.G. Knapp, S. Bang, S. Seifert, N.S. Yaw, J. Li, O.K. Farha, Q. Zhang, L.M. Moreau

4:30 XXX. Exploring Actinide Optical Properties through Extended Frameworks. **R. G. Surbella III**, A. Arteaga, and A. Nicholas

Breaking Borders and Building Bonds Through Energy

Smith Center for Undergraduate Excellence
CUE 407

Cosponsored by ENFL
H. Zhao, *Organizer*

1:55 Introductory Remarks.

2:00 303. Particle-size mixing as a route to high stability all-silicon electrodes for lithium-ion batteries with a liquid electrolyte. V. Joshi, W. Xu, **N.P. Stadie**

2:40 304. New double perovskite materials and their suitability for high temperature energy conversion applications. **B. Samuel**, J. Esakoff, S. Sofie, R.A. Walker

3:00 Ice Cream Social.

3:50 305. Unveiling conduction mechanism in lithium-doped high-entropy oxides for extreme-condition energy storage. **H. Zhang**, M. Song, X. Zhang, S. Wan, G. Wang, J. Liu, W. Li, H. Dong, C. Lou, Z. Chen, B. Chen

4:10 306. Pseudocapacitive lithiation of hexabenzocoronene and pyrolyzed derivatives. **C. McDaniel**, D. McGlamery, N.P. Stadie

Materials in the Nuclear Fuel Cycle: From Cradle to Grave

Smith Center for Undergraduate Excellence
CUE 418

Cosponsored by NUCL

1:55 Introductory Remarks.

2:00 . In-situ X-ray diffraction and Raman spectroscopy of $(Zr_{0.1}U_{0.9})O_2$ and $(Zr_{0.2}U_{0.8})O_2$. **S. Karcher**, S. Bang, C. Dixon Wilkins, N.S. Yaw, B. Merrill, A. Totten, X. Guo, J. McCloy

2:20 . The destiny of water in uranium dioxide nanoparticle synthesis for the production of nanoscale U/Th MOX fuel. **M.P. Heaney**, L.M. Moreau

2:40 387. In situ high-temperature X-ray diffraction and X-ray fine structure analyses of UO2: probing the dopant effect on thermal expansion and disorder. **J. Liu**, S. Bang, A. van Veelen, j. white, N. Dacheux, X. Guo

3:00 Ice Cream Social.

3:30 388. Thermal oxidation and high temperature structures of uranium carbide: in situ X-ray diffraction studies. **E.C. Kindall**, N.S. Yaw, J. Liu, C. Dixon Wilkins, S. Karcher, H. Xu, A. van Veelen, J.T. White, J. McCloy, X. Guo

3:50 380. Understanding the structure and dynamics of uranium-chlorine complexes in UCl_n - (KCl-LiCl) eutectics through atomistic simulations. A. Islam, X. Guo, **S. Banerjee**

4:10 382. Novel chloride volatility scheme for reprocessing advanced reactor used nuclear fuel. **J.M. Torrie**, I. Urraco, J. Wright, D. Rappleye

4:30 389. Rare earth element recovery from mixed chloride salts by isotachophoresis. **H. Hallikainen**, C. Ivory

Structures, Kinetics, and Thermodynamics at Interfaces

Smith Center for Undergraduate Excellence
CUE 219

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1:55 Introductory Remarks.

2:00 378. Probing the local coordination environment of atomically dispersed palladium supported on cerium oxide. **N.C. Nelson**, M. Prange, J. Nguyen, Z. Dohnalek

2:20 383. Interactions between plant cytochrome P450 reductase and mimics of plant ER membranes. **E.P. Jacobo**, J. Lewis, K. Shisler, J.A. Brozik, C. Kang

2:40 374. Thermodynamic driving forces of redox-dependent CPR insertion into biomimetic endoplasmic reticulum membranes. **M.J. Martinez**, J.D. Carder, E.L. Taylor, E.P. Jacobo, C. Kang, J.A. Brozik

3:00 Ice Cream Social.

3:30 384. Impact of oxygen-functional groups on CO_2 and CH_4 adsorption on carbon surfaces. **E.U. Osuagwu**, G. Loney, R.K. Szilagyi, N.P. Stadie

3:50 386. Investigating the role of induced macroporosity in ZIF-8 towards improved uptake kinetics in gas phase separations. **T. Hurley**

4:10 392. Enhancing and gating organic mixed ionic-electronic transport through local surface energy. **B. Collins**

New Frontiers in Mass Spectrometry and Gas-Phase Ion Manipulation

Smith Center for Undergraduate Excellence
CUE 209

Cosponsored by ANYL
B. Clowers, *Organizer*

2:15 Introductory Remarks.

2:20 327. Solving the "General Elution Problem" in ion mobility spectrometry. **E. Davis**, T. Koop, L. Vyhmeister, S. Gharari, J. Fehr, G. Valdez

3:00 Ice Cream Social.

3:30 326. Structures for lossless ion manipulations (SLIM) enabled mobility selective ion soft-landing for orthogonal characterization. **S.V. Garimella**

3:50 328. Hydrogen/deuterium exchange in ion mobility spectrometers: new instrumentation approaches and ion chemistry advantages. **D. Wu**, N. Morgan, H. Schramm, Z. Kinlein, B. Clowers

4:10 329. Multiplexing strategies for improving ion utilization in ion mobility spectrometry-mass spectrometry. **C. Greer**, E.R. Cabrera, N.W. Buzitis, B. Clowers

Engineering Solutions for Environmental Chemistry Challenges

Smith Center for Undergraduate Excellence
CUE 207

Cosponsored by ENVR
J. Moberly, *Organizer*

3:30 330. Withdrawn

3:50 331. Upcycling carbon fiber-reinforced epoxy composites into hydrothermally recyclable vitrimer composites under mild conditions. **B. Zhao**, C. Hao, J. Zhang

4:10 332. Enhancing the gaseous iodine adsorption of hierarchically porous UiO-66 MOFs via aromatic substitution. **S. Yu**, Q. Zhang

4:30 Closing Remarks.

WEDNESDAY MORNING

Exploring the Chemistry of Next-Generation Coolants and Solvents: Structure and Properties of Coolants, Fuels and Solvents

Smith Center for Undergraduate Excellence
CUE 409

Cosponsored by ENFL and NUCL
R. Gakhar, *Organizer*

8:00 Introductory Remarks.

8:05 353. Electrochemical behavior of corrosion and fission products in molten salts. P. Asghari-Rad, **H. Kim**

8:35 362. Calorimetric measurements of thermodynamic properties of molten salt: a case study of the binary eutectic $MgCl_2$-NaCl from 400 to 800 °C. **X. Guo**, J. Eakin, B. Merrill, K. Dahal, C. Ivory, J. Schorne-Pinto, T. Besmann, J. Lonergan

8:55 355. Absorption spectroscopy for interrogating structure and speciation in molten salt reactor- and pyroprocessing-relevant molten salt mixtures. **J. Moon**, **D. Chidambaram**

9:15 357. Determining thermophysical properties of actinide molten salts via AIMD. **B. Beeler**, D. Andersson, K. Duemmler

9:35 358. Unraveling complexities of speciation in molten salts. **S. Roy**, V. Bryantsev, L. Gibson, S. Gill, A. Frenkel, R. Gakhar

9:55 Morning Coffee/Snack Break.

10:30 359. In-situ monitoring of molten salts and off-gases using a combined spectroscopic approach. **m. raab**, A. Williams, R. Gakhar, R. Roper, Q. Yang

10:50 360. Iodide species in LiCl-KCl matrix: Thermal behavior and phase distribution with temperature. **M. Rodriguez Laguna**, R.H. Lazzari Garcia, S.T. Anderson, S. Gill, G. Holmbeck, R. Gakhar

11:10 361. Determining optical basicity of molten chloride salts by probe ion doping. **L. Sharpless**, J. Moon, D. Chidambaram

11:30 356. Withdrawn

11:50 354. Withdrawn

Breaking Borders and Building Bonds at Interfaces

Smith Center for Undergraduate Excellence
CUE 219

Cosponsored by ANYL and COLL
J. Bell, *Organizer*

8:05 Introductory Remarks.

8:10 333. Synthesis, structural characterization, and optical properties of core–satellite nanoassemblies comprising SiO_2 and Ag. **M. Haider**, W. Miran, M. Niazi

8:30 334. Development of a fully 3D-printed solid-contact ion-selective electrode. **S. Farahani**, D. Glasco, J. Bell

8:50 335. Gaining insight into the molecular organization within the nematic phase of bent-core oxadiazole containing liquid crystals. **E. Scharrer**

9:10 336. Regulation of zinc cycling on non-zinc surfaces using permanent magnets. **W.T. McLeod**, S. Pedaballi, J. Bell

9:30 337. Advanced thin film polyampholyte coatings to prevent bacteria adhesion and biofilm formation in microgravity. **A.E. Shea**, S. Oneida, K.V. Waynant, M. Bernards

9:50 Morning Coffee/Snack Break.

10:20 338. Pore functionalization in metal-organic frameworks for enhanced carbon dioxide capture in humid environments. **A. Gladysiak**, K.C. Stylianou

10:40 339. Unveiling poly(2-chloro-3,5, 6-trisulfide-1,4-benzoquinone) (PCTB) as a potential cathode material for aqueous zinc ion batteries. **S. Pedaballi**, W.T. McLeod, K.A. McCracken, J. Gordon

11:00 340. Probing Nanomorphology of guest component in ternary organic photovoltaics. **T. Melody**, A. Patterson, B. Collins

11:20 341. Combing DFT based optical models with resonant X-ray reflectivity to measure orientation at buried interfaces. **H. Heilman**, B. Collins

11:40 342. Green solvent enables record performance in model PCDTBT:PCBM organic solar cells through reduced recombination. **A. Patterson**, B. Collins

Advancements and Training in Nuclear Materials Processing and Sensing in Harsh Environments

Smith Center for Undergraduate Excellence
CUE 418

Cosponsored by NUCL
S. A. Bryan, A. Schafer Medina, *Presiding*

8:25 Introductory Remarks.

8:30 344. Development and retention of a sustainable nuclear workforce. **J.L. Bryant**

9:10 345. Determination of ^{133}Cs, ^{135}Cs, and ^{137}Cs isotopes in the presence of Ba using ICP-MS/MS. T. McCall, **M. Lindberg**

9:30 346. Electrochemical investigation of Europium and Uranium redox kinetics using Boron-Doped Diamond electrodes in a molten salt environment. **J.M. Rakos**, N. Damjanovic, D. weber,

S. Kazemeini, A. Lines, S.A. Bryan, W.R. Heineman, S.D. Branch, C.A. Rusinek

9:50 Morning Coffee/Snack Break.

10:20 347. Development of online monitoring sensors and chemometric models for chemical composition analysis in molten salts. **A. Schafer Medina**, S. Choi, J.M. Rakos, S.D. Branch, H. Felmy, S.A. Bryan, A. Lines

10:40 348. Substitution of concentrated nitric for fuming nitric in Sr-90 separation for Hanford Tank Waste. **A. Killgore**

Breaking Borders in the Nuclear Science Enterprise

Smith Center for Undergraduate Excellence
CUE 419

Cosponsored by NUCL
J. M. Boncella, A. Lines, *Organizers*
N. J. Henson, *Presiding*

8:25 Introductory Remarks.

8:30 349. Progress in Hanford tank waste treatment. **T. Brouns**

9:10 350. Nuclear nanotechnology: Mechanisms behind the formation of uranium oxide nanoparticles. **L.M. Moreau**

9:50 Morning Coffee/Snack Break.

10:20 351. Towards real time optimization of chemical processing of a nuclear forensics sample. **N.E. Uhnak**, M. Dinpajooh, A.M. Ritzmann, R. Overstreet, L.A. Metz

11:00 352. Re-evaluating the value proposition of recycling used nuclear fuel. **A. Lines**, W. Nutt, S. Arm, G.B. Hall, G.J. Lumetta, P. Paviet, B. Riley, B.N. Seiner, P.K. Thallapally, A. Zbib

Breaking Borders and Building Bonds at the Limits of Detection

Smith Center for Undergraduate Excellence
CUE 209

Cosponsored by ANYL
E. Linskey, *Organizer*

8:45 Introductory Remarks.

8:50 274. Super-resolution IR microscopy that can be combined with simultaneous Raman and co-located fluorescence for a wide range of applications. **t. yan**, E. Dillon, J. Anderson, M. Kansiz

9:10 275. Spatially resolved cyano radical in nitromethane monopropellant combustion. **B.N. Dean**, O. Wolff, R.A. Walker

9:30 276. Pushing analytical detection limits to investigate high-purity materials for dark matter detectors. **M. di Vacri**, **T. Schlieder**, N. Rocco, I. Arnquist, K. Hobbs, A. French

9:50 Morning Coffee/Snack Break.

10:20 277. Extraction and analysis of SVOC in Hanford tank waste by SBSE/TD/GC-MS. **S. Bairai**

10:40 385. 1- and 2-dimensional imaging of high pressure monopropellant combustion. **O. Wolff**, B.N. Dean, J.B. Sinrud, R.A. Walker

11:00 390. Elemtal analysis of challenging Matsricies by ICP-MS. **E.T. Linskey**

Breaking Borders and Building Bonds Through Synthesis

Smith Center for Undergraduate Excellence
CUE 416

Cosponsored by CATL
W. D. Bailey, *Organizer*

8:45 Introductory Remarks.

8:50 363. Cr^{2+} in square planar coordination: durable and intense magenta pigments inspired by lunar mineralogy. **A. Verma**, J. Li, M. Subramanian

9:10 364. H-X addition to ruthenium complexes bearing PNNNP ligands. **N. Fisher**, J.M. Boncella

9:30 365. First-row transition metal pincer complexes for the electrochemical reduction of CO_2. **W.D. Bailey**, J. Smith, S. von Fuchs, S. Dillinger