

DR. CHRISTOPHER G. GIANOPOULOS

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ACADEMIC BACKGROUND

University of Toledo, Department of Chemistry, Toledo, OH

Senior Research Associate

2016 – present

Postdoctoral Research Assistant

2014 – 2016

- Conducted state of the art X-ray charge density experiments at liquid helium temperature
- Prepared crystalline cerium and uranium complexes for X-ray charge density measurements
- Performed data reduction and charge density refinements on large data sets (8 GB raw data)
- Developed methodology for conducting charge density refinements on heavy metal compounds
- Supervisor: A. Alan Pinkerton

Ph.D. in Chemistry

2014

- Dissertation Topic: “Development of Bulky Dipyrromethene Complexes of Aluminum, Zinc, and Rhodium”
- Synthesized and characterized organoaluminum, organometallic and inorganic complexes and (pre)catalysts
- Supervisor: Mark R. Mason

Purdue University, West Lafayette, IN

B.S. in Chemical Engineering

2009

B.S. in Chemistry

2009

Undergraduate Research

2005 – 2009

- Developed synthetic methodology to insert platinum and palladium into cationic water soluble porphyrins
- Advisor: David R. McMillin

RESEARCH INTERESTS AND EXPERIENCE

X-ray crystallography and Charge Density Studies

Wide range of experience conducting state of the art X-ray diffraction experiments

- High resolution, high-accuracy electron density studies: from crystal growth to data collection at liquid helium temperatures and analysis of large data sets (8 GB+)
- Developed methodology for charge density studies concerning heavy metal containing compounds
- First experimental charge density study of uranium-fluorine bond and of a U(V) system
- Expert in the handling of challenging single-crystal diffraction data
 - Solution/ refinement of twinned crystals (merohedrally, pseudo-merohedrally and non-merohedrally)
 - Refinement of complicated disorder and superstructures
 - Handling of air-sensitive and rapidly desolvating samples
- Supervision and training of graduate students for data collection and structure refinement
- Routine maintenance of Bruker and Rigaku platform diffractometers

Inorganic synthesis and photochemistry

- Synthesis and characterization of complexes of aluminum, zinc, chromium, nickel and rhodium supported by a new class of bulky dipyrromethene ligands
- Training, supervising and mentoring students in lab and with instrumentation

- Developed synthetic methodology for the preparation of palladium and platinum complexes of cationic, water-soluble porphyrin ligands with intended application as sensitizers for photodynamic therapy

Computational chemistry

- Proficient in the use of gas-phase and solid-state calculations to complement experimental data and support conclusions derived from experiment (Gaussian and Crystal09 software suites)

PUBLICATIONS AND SELECT PRESENTATIONS

- C. G. Gianopoulos, V. V. Zhurov, A. A. Pinkerton *IUCrJ*, **2019**, *submitted*. “Charge densities in actinide compounds: strategies for data reduction and model building”
- C. G. Gianopoulos, Z. Chua, V. V. Zhurov, C. A. Seipp, X. Wang, R. Custelcean, A. A. Pinkerton *IUCrJ* **2019**, *6*, 56-65. “Direct air capture of CO₂ – Topological analysis of the experimental electron density (QTAIM) of the highly insoluble carbonate salt of 2,6-pyridine-bis(iminogaunidine), (PyBIGH₂)(CO₃)(H₂O)₄”
- J. P. Tidey, V. V. Zhurov, C. G. Gianopoulos, T. S. Hermann, A. A. Pinkerton *J. Phys. Chem. A* **2018**, *122*, 9676-9687. “QTAIM assessment of the intra- and intermolecular bonding in a bis(nitramido-oxadiazolate) energetic ionic salt at 20 K”
- B. Dziuk, C. G. Gianopoulos, K. Ejsmont, B. Zarychta *Struct. Chem.* **2018**, *29*, 703-713. “Self-assembly mechanism based on charge density topological interaction energies”
- J. P. Tidey, V. V. Zhurov, C. G. Gianopoulos, E. A. Zhurova, A. A. Pinkerton *J. Phys. Chem. A* **2017**, *121*, 8962-8972. “Experimental charge-density study of the intra- and intermolecular bonding in TKX-50”
- Z. Chua, C. G. Gianopoulos, B. Zarychta, E. A. Zhurova, V. V. Zhurov, A. A. Pinkerton *Cryst. Growth Des.* **2017**, *17*, 5200-5207. “Inter- and Intramolecular bonding in 1,3,5-triamino-2,4,6-trinitrobenzene: An experimental and theoretical quantum theory of atoms in molecules (QTAIM) analysis”
- Z. Chua, B. Zarychta, C. G. Gianopoulos, V. V. Zhurov, A. A. Pinkerton *Acta Cryst. B* **2017**, *73*, 654-659. “Revisiting the charge density analysis of 2,5-dichloro-1,4-benzoquinone at 20 K”
- C. G. Gianopoulos, Z. Chua, V. V. Zhurov, A. A. Pinkerton *J. Appl. Cryst.* **2017**, *50*, 643-646. “λ/2 contamination in X-ray diffraction data – the impact of heavy atoms”
- C. G. Gianopoulos, V. V. Zhurov, S. G. Minasian, E. R. Batista, C. Jelsch, A. A. Pinkerton *Inorg. Chem.* **2017**, *56*, 1775-1778. “Bonding in uranium(V) hexafluoride based on the experimental electron density distribution measured at 20 K”
- C. G. Gianopoulos, N. Kumar, Y. Zhao, L. Jia, K. Kirschbaum, M. R. Mason *Dalton Trans.* **2016**, *45*, 13787-13797. “Aluminum alkoxide, amide and halide complexes supported by a bulky dipyrromethene ligand: application to the ring-opening polymerization of ε-caprolactone”
- C. G. Gianopoulos, B. Zarychta, S. Cenedese, V. V. Zhurov, A. A. Pinkerton *J. Phys. Chem. A* **2016**, *120*, 4059-4070. “Experimental and theoretical charge-density of two norbornene derivatives: insights on reactivity”
- B. Zarychta, C. G. Gianopoulos, A. A. Pinkerton *Bioorg. Med. Chem. Lett.* **2016**, *26*, 1416-1418. “Revised structure of *trans*-resveratrol: Implications for its proposed antioxidant mechanism”
- K. Gajda, K. Ejsmont, Z. Daszkiewicz, C. G. Gianopoulos, B. Zarychta *J. Mol. Struct.* **2016**, *1108*, 590-593. “X-ray, conformation and electronic structures of 1-nitropyrrolidine”
- C. G. Gianopoulos, K. Kirschbaum, M. R. Mason *Organometallics* **2014**, *33*, 4503-4511. “Mono- and bimetallic aluminum alkyl, aryl, and hydride complexes of a bulky dipyrromethene ligand”
- M. A. Bork, C. G. Gianopoulos, H. Zhang, P. E. Fanwick, J. H. Choi, D. R. McMillin *Inorg. Chem.* **2014**, *53*, 714-724. “Accessibility and external versus intercalative binding to DNA as assessed by

oxygen-induced quenching of the palladium(II)-containing cationic porphyrins Pd(T4) and Pd(tD4)”

Invited oral presentation at the Sagamore conference on charge densities, Halifax NS, **2018**

“Methods development for charge density studies of actinide compounds: from data reduction to model building”

RELATED EXPERIENCE

University of Toledo, Department of Chemistry, Toledo, OH

Assistant to the NMR Facility **2013 – 2014**

- Responsible for cryogen fills (liquid nitrogen and liquid helium), probe calibration, heteronuclear decoupler calibration and instrument training for graduate students
- Supervisor: Dr. Yong-Wah Kim

Dupont, Chambers Works Facility, Deepwater, NJ

Chemical Engineering Co-op Student **2006**

- Analyzed several years of plant yields, demonstrating seasonal correlation between yield and temperature
- Responsible for updating plant process and instrumentation diagrams
- Communicated with vendors during acquisition of new process units
- Supervisor: Stephen Tieri

ADDITIONAL SKILLS

Organometallic and Organic Synthesis: Air- and moisture-sensitive synthetic techniques including standard dry-box, Schlenk and high vacuum manifold. Purification of organic and organometallic compounds by several techniques (e.g. column chromatography, crystallization, sublimation and distillation).

Analytical: Multinuclear NMR spectroscopy (considerable experience with maintenance of Bruker and Varian NMR spectrometers), SEM, SEM-EDX, GC/FID, LC/ESI-MS, FT-IR, TGA/DSC, UV/Vis, CV, emission spectroscopy, circular dichroism

Mechanical/Maintenance Skills: Maintenance of vacuum pumps, Schlenk lines, NMR and ESI/MS spectrometers, X-ray diffractometers, and dry-boxes

Computer Literacy: SHELXTL, XD, Platon, WinGX, OLEX2, superflip, CSD and CCDC software, Microsoft Office suite, Matlab, ChemDraw, SciFinder Scholar

TEACHING EXPERIENCE

University of Toledo, Department of Chemistry, Toledo, OH

Teaching Assistant – “Advanced Lab I” **2012**

Teaching Assistant – “Analytical Chemistry Lab” **2011**

- Elected by faculty to oversee both physical and analytical chemistry laboratory classes, as a result of demonstrated knowledge of physical and analytical chemistry and excellent communication and scientific writing skills

Teaching Assistant – “Organic Chemistry Lab I & II” **2012 – 2013**

- Oversaw laboratory experiments, gave introductory lectures, graded all written work, met with students upon request and during weekly help sessions

Teaching Assistant – “General Chemistry I & II”

2009 – 2010

- Lead recitation sections, met with students upon request and during weekly help sessions, graded all written work, helped grade exams

AWARDS

Oxford Cryosystems Low Temperature Poster Prize at ACA 2016

2016

ACA Travel Grant, American Crystallographic Association

2016

Dale Margerum Undergraduate Research Award, Purdue University

2008

PROFESSIONAL AFFILIATIONS

American Chemical Society

2015 – present

American Crystallographic Association

2016 – present