

DOUGLAS M. FRANZ

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EDUCATION

B.S. University of South Florida, Honors College. 2009 - 2013

GPA: 3.22; 136 credits

Major: *Environmental Science & Policy*

Ph. D. University of South Florida, Dept. of Chemistry. 2014 – 2019

GPA: 3.50; 114 credits

Concentration: *Computational chemistry*

PROFESSIONAL EXPERIENCE

2007 - : *Software Engineer, Webmaster and Programming Consultant*

University of South Florida Chemistry Dept.

Equiday, Inc. (now Allovue)

Uncertainty Quantification Foundation

Roche, Inc.

2011: *SAT Teacher/Tutor*

The Princeton Review

2012-2013: *Academic Tutor*

University of South Florida Athletic Dept.

2014 - 2019: *Chemistry Lab Instructor, Research Scientist*

University of South Florida Chemistry Dept.

2019: *Postdoctoral Scientist*

Molekule, Inc.

2019 - 2021: *Scientist/Engineer*

Rincon Research Corporation

2019 - : *Visiting Scientist*

University of South Florida Chemistry Dept.

North Carolina State University Chemistry Dept.

2021: *Adjunct Instructor*

Florida Institute of Technology

2021 - 2023: *Radar Systems Engineer*
Ursa Space Systems

2021 - : *CEO*
Calculus Corp

AWARDS

2009 - 2010: USF Presidential Scholars Award
2009 - 2013: Bright Futures Academic Scholars Award
2009 - 2013: Federal Pell Grant
2009 - 2013: USF Honors College Scholarship
2009 - 2010: USF Undergraduate Research Scholarship
2009 - 2010: Florida Student Assist Grant
2010: USF Undergraduate Research Office of National Scholarships Award
2010: Fred L. & Helen Tharp Endowed Scholarship
2010: Federal SMART Grant
2011: Outstanding Undergraduate Research Presentation Award, Environmental Sciences, Florida Academy of Sciences
2013: Study Abroad Scholarship for study in Germany (Universität Osnabrück)
2015: Martin Travel Award for Graduate Research (to U. Texas at Austin) (USF)
2016: First Place Graduate Talk, USF Chemistry Castle Research Conference
2017: Alexiou Award in Environmental Chemistry, USF Dept. of Chemistry
2020: Employee Recognition Spot Bonus, RRC
2022: Employee Performance Bonus, Ursa Space Systems

PRESENTATIONS / TRAVEL

1. Oral Presentation: "Comparison of anion removal capacities of Octolig and Cuprilig." Florida Academy of Sciences 50th Annual Meeting, Melbourne, FL. **2011**.
2. Poster Presentation: "Bisphenol acetone: what to do when an apparently good invention goes wrong?" National Academy of Inventors 2nd Annual Conference, Tampa, FL. **2013**.
3. Poster Presentation: "Removal of BPA model compound using metalloligs, metal derivatives of Octolig(R)". University of South Florida Castle Conference, Tampa, FL. **2013**.
4. Poster Presentation: "Understanding MOF/gas interactions by calculation of relative atomic charges in the MOF NOTT-112". University of South Florida Castle Conference, Tampa, FL. **2015**.

5. Summer Supercomputing Institute Attendee. Texas Advanced Computing Center (TACC), University of Texas at Austin. **2015**.
6. Oral Presentation: “Hydrogen Gas Sorption in MOF NOTT-112”. University of South Florida Castle Chemistry Conference, Tampa, FL, **2016**.
7. Oral Presentation: “Gas sorption in rht-MOF-9”. University of South Florida Castle Chemistry Conference, Tampa, FL, **2017**.
8. Oral Presentation: “Gas sorption in rht-MOF-9”. ACS FAME Conference. Palm Harbor, FL, **2017**.
9. Oral Presentation: “Gas sorption in rht-MOF-9”. LAMMPS Conference, Sandia National Laboratories, Albuquerque, NM, **2017**.
10. Oral Presentation: “MCMD (Monte Carlo/Molecular Dynamics): Cutting edge software for porous materials simulation”. University of South Florida Castle Chemistry Conference, Tampa, FL, **2018**.
11. Oral Presentation: “MCMD (Monte Carlo/Molecular Dynamics): Cutting edge software for porous materials simulation”. Computational Science Club Spring Research Colloquium, Tampa, FL, **2019**.
12. Poster Presentation: “MCMD (Monte Carlo/Molecular Dynamics): Cutting edge software for porous materials simulation”. MOFSIM 2019 Conference, Ghent, Belgium **2019**.
13. Oral Presentation: “Simulation and software development to understand interactions of guest molecules in porous materials”. Johns Hopkins University, Baltimore, MD, **2019**.

PUBLICATIONS

1. Martin, Dean F. and Douglas M. Franz (**2011**): Comparison of anion removal capacities of Octolig® and Cuprilig, J. Environ. Sci. Hlt, Part A. 46:14, 1619- 1624.
2. Franz, Douglas M. and D. F. Martin (**2011**), Evaluation of the removal capacities of Octolig®, a supported polyethylimine, for selected anions. Florida Scientist, 74 (S1), 70-71.
3. Franz, Douglas. M. and Dean. F. Martin (**2013**), Enhanced removal of

- aqueous BPA Model Compounds Using Metalloligs, *J. Environ. Sci. Hlt, Part A*. 49, 307- 312.
4. Franz, Douglas M. (2013), Removal of aqueous BPA Model Compound 4-tbutylphenol Using Metalloligs, USF Honors College Research Theses in Chemistry Spring 2013, 41 pages.
 5. Franz, D.; Forrest, K. A.; Pham, T.; Space, B. Accurate H₂ Sorption Modeling in the rht-MOF NOTT-112 Using Explicit Polarization. *Cryst. Growth Des.* **2016**, DOI: 10.1021/acs.cgd.6b01058.
 6. Pham, T.; Forrest, K.; Franz, D.; Space, B. Predictive Models of Gas Sorption in a Metal-Organic Framework with Open-Metal Sites and Small Pore Sizes. *Phys. Chem. Chem. Phys.* **2017**, DOI: 10.1039/C7CP02767B
 7. Pham, T.; Forrest, K.; Franz, D.; Space, B. Experimental and Theoretical Investigations of the Gas Adsorption Sites in rht-Metal–Organic Frameworks. *Cryst. Eng. Comm.* (2017). DOI: 10.1039/C7CE01032J
 8. Franz, Douglas, et al. "Simulations of Hydrogen, Carbon Dioxide, and Small Hydrocarbon Sorption in a Nitrogen-Rich rht-Metal-Organic Framework." *Physical Chemistry Chemical Physics* (2017).
 9. Forrest, K. et al. "Investigating C₂H₂ Sorption in α -[M₃(O₂CH)₆] (M = Mg, Mn) Through Theoretical Studies." *Cryst. Growth Des.* **2018**, DOI: 10.1021/acs.cgd.8b00770
 10. Franz, D. et al. "Theoretical study of the effect of halogen substitution in molecular porous materials for CO₂ and C₂H₂ sorption." *AIMS Mat. Sci.* **2018**, DOI: 10.3934/mat.2018.2.226
 11. Ferreira, G. C. et al. "Iron Hack - A symposium/hackathon focused on porphyrias, Friedreich's ataxia, and other rare iron-related diseases." *F1000 Research*. **2019**
 12. Franz, D. et al. "MPMC and MCMD: free high performance simulation software for atomistic systems" *Adv. Theory Sim.* **2019**, DOI:10.1002/adts.201900113
 13. Arun, P. et al. "A Microporous Co-MOF for Highly Selective CO₂ Sorption in High Loadings Involving Aryl C–H...O=C=O Interactions: Combined Simulation and Breakthrough Studies" *ACS Inorganic Chem.*, **2019**, DOI:10.1021/acs.inorgchem.9b01402
 14. Yu, M-H. et al. "Enhanced gas uptake in a microporous metal-organic

- frame-work via a sorbate induced-fit mechanism". J. Am. Chem. Soc., **2019**. DOI: 10.1021/jacs.9b07807
15. Mukherjee, S. et al. "Trace CO₂ capture by an ultramicroporous physisorbent with low water affinity". Sci. Adv., **2019**. DOI: 10.1126/sciadv.aax9171
 16. Douglas M. Franz. "Simulation and Software Development to Understand Interactions of Guest Molecules in Porous Materials". University of South Florida Doctoral Dissertations. **2019**.
 17. Mukherjee, S. et al. "Halogen-C₂H₂ Binding in Ultramicroporous MOFs for Benchmark C₂H₂/CO₂ Separation Selectivity". Eur. Chem., **2020**. DOI: 10.1002/chem.202000008
 18. Mukherjee, S. et al. "Ultramicropore engineering by dehydration to enable molecular sieving of H₂ by calcium trimesate". Ang. Chem., **2020**. DOI: 10.1002/ange.202006414
 19. Pal, A. et al. "Immobilization of a Polar Sulfone Moiety onto the Pore Surface of a Humid Stable MOF for Highly Efficient CO₂ Separation under Dry and Wet Environment through Direct CO₂-Sulfone Interactions." ACS App. Mat. & Int., **2020**. DOI: 10.1021/acsami.0c07380
 20. Naderlou, S. et al. "Multi-scale computational investigation of Ag-doped two-dimensional Zn-based MOFs for storage and release of small NO and CO bioactive molecules", **2023**. DOI: 10.1039/D2CP04725J

MEMBERSHIP, LEADERSHIP & SERVICE ACTIVITIES

2018 - 2019:

Webmaster and Graduate Mentor, Computational Science Club USF

2016 - 2019:

Research Mentor for High School teachers, USF RET Summer Program

2014 - 2019:

Research Mentor for undergraduates, USF (2014 – 2019)

2016 - 2019:

Research Conference Committee planning member, USF Castle Conf.

2014 - 2019:

University Lab and Field Safety Committee Member, USF

2014 - 2019:

Environmental Health & Lab Safety Committee Member, USF

2006 - 2009:

Volunteer, Hospice of Florida Suncoast

Member, National Society of High School Scholars
Member, American Chemical Society
Member, Florida Academy of Sciences
Member, Phi Sigma Theta National Honor Society
Member, National Society of Collegiate Scholars
Member, USF Honors College Alumni

LANGUAGE SKILLS

Spanish: 5 years education and 9 months of language immersion in Colombia, South America. Conversationally fluent.

German & Hebrew: Elementary skill

TEST SCORES

2009: SAT

Math: 780 / 800

Reading: 640 / 800

Writing: 720 / 800

Essay: 12 / 12

2012: GRE

Verbal: 163 / 170

Quantitative: 160 / 170

Writing: 4.5 / 6

2015: American Chemical Society Qualifying exams passed

Organic

Physical

Analytical

SKILLS

Laboratory chemistry skills:

- o Electrochemistry
- o Spectrophotometry
- o Organic synthesis
- o Column chromatography

Programming language proficiencies:

- o Advanced:
HTML, CSS, PHP (OOP, MVC), MySQL, SQLite3,

JavaScript, jQuery, Python, BASH, LaTeX, C, C++, Fortran, Ruby (on Rails)

- o Intermediate:
XML, Java, SQLite, QML
- o Basic:
C#, XAML, VBScript, R

Advanced Proficiency with the following software:

- o Microsoft Office & Linux equivalent
- o Git, SVN (Code version control)
- o Q-Chem, NWChem, Orca, CP2K, LAMMPS, MPMC, MCMD (Molecular simulation software)
- o Visual Molecular Dynamics, Molden, Ovito (Chemical visualization software)
- o Android Studio, Qt Creator (app development IDEs)
- o Notepad++, Geany, gEdit, sublime, vim (text editors)
- o Intuit Quickbooks
- o GIMP (Graphic design tool)
- o Amazon Web Services (AWS) and Google Cloud Platform (GCP)

And the following operating systems:

- o Windows 2000, XP, Vista, 7, 8, 10
- o Mac OSX
- o Linux Ubuntu, Fedora, RedHat
- o Raspberry Pi 3 (Raspbian)

Other:

- o Acoustic and electric guitar, drums, and piano
- o Metallurgy (smelting and casting); electroplating
- o Natural product distillation
- o Breadboard electronics

REFERENCES

Brian Space, Ph.D.

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Christian Cioce, Ph.D.

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