Jake Tyler Sirlin

Tutor & Chemist · Delta Tutoring

Objective

Teacher and researcher driven by their *productivity, work ethic, collaborative efforts*, and *boundless dedication and enthusiasm*. Research background of hands-on experience in *synthetic* and *analytical chemistry* with expertise in *organometallic catalysis*, *air-sensitive manipulations*, *spectroscopy*, and *product analysis*. Eager to demonstrate their skills and passion by navigating complex challenges — with an open mind and thoughtful approach.

Education

University of North Carolina at Chapel Hill
Chapel Hill, NC

Ph.D., Inorganic Chemistry
August 2020 - May 2025

Alexander J. M. Miller (2024-2025) & Gerald Meyer (2020-2024)

University of Miami
Coral Gables, FL

Bachelor of Science in Chemistry (ACS Certified) and Economics, Minors in Mathematics and Physics
August 2016 - May 2020

Carl Hoff & Angel Kaifer

Teaching Experience

CHEM 350L - Research in Chemistry for Undergraduates
UNC Chapel Hill

Graduate Research Assistant Mentor for Two Undergraduate Research Assistants, Department of Chemistry
August 2020 - May 2021

CHEM 550L - Synthetic Inorganic Laboratory
UNC Chapel Hill

Graduate Teaching Assistant, Department of Chemistry
August 2020 - May 2021

CHM 360 & 365 - Physical Chemistry I and II
University of Miami

Undergraduate Workshop Leader, Department of Chemistry
September 2019 - May 2020

CHM 114 - General Chemistry II Laboratory
University of Miami

Undergraduate Teaching Assistant, Department of Chemistry
January 2019 - January 2020

EXPERIENCE

Delta Tutoring
Virtual

Tutor
September 2014 - Present

- Tutor high school and undergraduate students in subjects of chemistry and mathematics.
- Develop meaningful relationships with students in order to continue promoting an environment of scholastic achievement both inside and outside an academic setting.
- Support those with difficulties learning or retaining information by creating custom lesson plans and specialized learning activities in order to enable their further educational success.

Nuclear Magnetic Resonance Lab
UNC Chapel Hill

Research Technician, Department of Chemistry
August 2025 - Present

- Demonstrated **in-line flow and low-field** capacities of NMR spectroscopy for **electrochemical and photochemical product analysis** using **Magritek's Spinsolve 80MHz Benchtop NMR Spectrometer** and **Bruker's Fourier 80MHz Benchtop NMR Spectrometer** in tandem with other in-line spectroscopy techniques
- Developed pulse programs and automation programs for qNMR techniques using external standards (**ERETIC2**), rapid T_1 measurements (**FLIPS**), and maintained multiple high-field spectrometers using **broadband and cryogenic probes** (400, 500, and 600 MHz)
- Furthered expertise in NMR experimental design, pulse program design, and (cryogenic) spectrometer maintenance — such as **using Bruker TopSpin and Mestrelab MNova software, pulse program design, heteronuclear NMR, 2D-NMR, variable temperature, quantitative NMR, PULCON, photoNMR, flow-NMR, and low-field (Magritek and Bruker) and high-field (Bruker) instruments**

Meyer Research Group
UNC Chapel Hill

Graduate Research Assistant, Department of Chemistry
June 2020 - May 2025

- Employed **NMR spectroscopy**, **GC & GC/MS**, solution and solid-state **FTIR spectroscopy**, and **UV-Vis spectroscopy** for production monitoring and quantitative analysis of gaseous/liquid fuels
- Developed expertise in NMR experimental design, techniques, and analysis — such as **using Bruker TopSpin and Mestrelab MNova software, pulse program design, heteronuclear NMR, 2D-NMR, variable temperature, quantitative NMR, PULCON, photoNMR, flow-NMR, and low-field and high-field instruments**
- Designed methodologies for synthesis and studies of **metal-oxide (SiO_x, TiO_2, SnO_x, FTO)** surface interactions, including experience with **clean room preparation, HF-etching, spin coating, p-XRD and XPS**
- Synthesized and investigated interactions of Lewis acids with ruthenium carbonyl complexes and related intermediates relevant to **CO reduction**
- Performed **mechanistic studies** into **methanol formation** with $[Ru(bpy)_2(CO)_2]^{2+}$, specifically involving formyl and hydroxymethyl intermediates
- **Mentored two undergraduate students** on independent projects over a one year span
- Acted as **laboratory safety officer** for 4 years, installing and enforcing productive and ethical safety culture in the lab space and acting as the group liaison and the "Research and Analysis Subcommittee" chair of the UNC Joint Safety Team

Hoff Research Group
University of Miami

Undergraduate Research Assistant, Department of Chemistry
June 2019 - June 2020

- Conducted research focused on **synthesis, molten salt analysis, catalysis, calorimetry, and spectroscopic** detection of **nitrogen oxide complexes**
- Identified structure of unknown hyponitrite complexes, transition states, and catalytic products through spectroscopic and crystallographic analysis

Kaifer Research Group
University of Miami

Undergraduate Research Assistant, Department of Chemistry
August 2018 - December 2018

- Performed **synthesis and electrochemical studies** of selective macrocyclic host molecules
- Explored the use of **proton-coupled electron transfer reactions** to better understand and modulate the selective association processes of pillar[n]arenes for drug delivery

PUBLICATIONS & PRESENTATIONS

Journal Publications

- **Reduction of CO to Methanol with Recyclable Organic Hydrides** Müller, A. V.; Ahmad, S.; Sirlin, J. T.; Ertem, M. Z.; Polyansky, D. E.; Grills, D. C.; Meyer, G. J.; Sampaio, R. N.; Concepcion, J. J. *Journal of the American Chemical Society* **2024**, *146* (15), 10524-10536. DOI: 10.1021/jacs.3c14605.

Oral Presentations

Southeastern Regional Meeting of the ACS 2023
Durham, NC

Oral Presentation
October, 2023

- *Lewis Acid-Formyl Adducts with Enhanced Durability and Reactivity*

ACS Spring 2023 National Meeting & Exposition
Indianapolis, IN

Oral Presentation
March, 2023

- *Impact of Lewis Acid-Base Adduct Formation on the Durability and Reactivity of a Ruthenium Formyl Complex*

Poster Presentations

4th International Conference on Proton-Coupled Electron Transfer (PCET4)
Tarragona, Spain

Poster Presentation
June, 2023

- *Lewis Acid-Formyl Adducts with Enhanced Durability and Reactivity*

Gordon Research Conference/Seminar - Electron-Donor Acceptor Interactions

Newport, RI

Poster Presentation

August 3, 2022

- *Lewis Acid Interactions of Metal Formyl Intermediate*

LEADERSHIP & SERVICE

Gordon Research Seminar - Electron Donor-Acceptor Interactions

UNC Chapel Hill

Chair

July 2024

- Nominated by 70 peers and colleagues to chair international conference for Early Career Researchers in the field of Electron Transfer
- Organized two day conference for 70 attendees

Joint Wellness Team

UNC Chapel Hill

Co-Founder and President

June 2023 - June 2024

- Successfully fund-raised and funded an Embedded Wellness Counselor Program in the Chemistry Department
- Petitioned over 1000 graduate students and postdoctoral fellows and received 300 signatures on a letter to the Provost asking for more accessible mental health resources for graduate students and postdoctoral fellows

Student and Postdoc Wellness Committee

UNC Chapel Hill

Committee Member

June 2023 - June 2024

- Led organization focused on destigmatizing mental health and providing resources in the Chemistry Department
- Successfully fundraised and funded an Embedded Wellness Counselor Program in the Chemistry Department
- Petitioned over 1000 graduate students and postdoctoral fellows and received 300 signatures on a letter to the Provost asking for more accessible mental health resources for graduate students and postdoctoral fellows

Mortar Board Honor Society, Nu Kappa Tau Chapter

University of Miami

President

April 2019 - May 2020

- Enforced chapter and national bylaws and policies. Presided over chapter meetings and over the initiation of new members
- Served as the official chapter delegate to the national conference and relayed information to officers and advisors

HONORS & AWARDS

Gordon Research Seminar Chair

UNC Chapel Hill

GRS - Electron Donor-Acceptor Interactions

July 2024

Undergraduate Teaching Award

University of Miami

Department of Chemistry

April 2019

Omicron Delta Kappa Honor Society

University of Miami

University of Miami Chapter

April 2019

Mortar Board Honor Society

University of Miami

Nu Kappa Tau Chapter

April 2019

SKILLS

Analytical Techniques	**NMR Spectroscopy** (*Bruker and Magritek Systems*)
	UV-Vis Absorption & Photoluminescence Spectroscopy (*Cary & Custom Systems*)
	Solution & Solid-State (ATR) FTIR Spectroscopy (*Bruker Systems*)
	Fuel Product Quantification & Analysis using GC, GC/MS, & LC-MS (*Agilent GC & GC/MS Systems, Thermo HF-X Systems*)
	Electrochemistry with Conductive and Semiconductive Electrodes (*Pine Research & CHI Instruments Potentiostats*)
	Surface Analysis (*Clean Room Experience, HF-etching, Spin Coating, p-XRD and XPS*)
Synthetic Techniques	**Ambient and Inert Synthesis** (*MBraun Gloveboxes, Vacuum & Gas Manifolds, Solvent Purification Systems*)
	Metal Complex Design and Characterization (*1mg - 100g; Ru, Re, Ir, Cu, Mo, Pt, and Pd Complexes*)
	Organic Molecule and Ligand Design and Characterization (*1mg - 100g; Pyridines, Imidazoles, Carbene Derivatives*)
	Synthetic Purification Techniques (*Recrystallization, Column Chromatography, Biotage Selekt Flash Chromatography*)
	Metal Oxide Surface Preparation (*SiO_x, TiO_2, SnO_x, FTO surfaces*)
Scientific Software	**ChemOffice, Gaussian, Origin, Wolfram Mathematica, Microsoft Office, Adobe Illustrator, Adobe Photoshop, Adobe Premiere**
	Bruker TopSpin, Mestrelab MNova, Agilent MassHunter & Analysis Software
	Bruker Opus, Pine AfterMath, Bruker APEX, CCDC Software
Programming	**LaTeX, Python, Wolfram Language, Origin C**, MATLAB, Labview, R

HOBBIES

Rock Climbing, Computer Building, Keyboard Construction and Design, 3D Printing, Language Learning (Spanish, Japanese), Baking (pastries and breads)