

BIOGRAPHICAL SKETCH

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NAME: Saks, Andrew

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: PhD Student

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

| INSTITUTION AND LOCATION | DEGREE (if applicable) | Start Date MM/YYYY | Completion Date MM/YYYY | FIELD OF STUDY |
|--|---------------------------|-----------------------|----------------------------|---------------------------------|
| The Ohio State University, Columbus, OH | BS | 08/2019 | 05/2023 | Chemistry, minor in Mathematics |
| University of Pennsylvania, Philadelphia, PA | PhD | 08/2023 | 05/2028 (Expected) | Biophysical Chemistry |

A. Personal Statement

I have wanted to be a scientist for as long as I can remember. This passion was fostered by my grandfather, who has a PhD in chemistry and worked as a physical chemist. Not only did he inspire me to become a chemist myself, but he also taught me the joy of helping others understand and appreciate our world at a microscopic level. My undergraduate experience was a direct reflection of these values. I attended The Ohio State University where I obtained a bachelor's degree in chemistry and got involved in undergraduate research as a freshman. I joined the lab of Dr. Bern Kohler, a physical chemist who studies the photophysical properties of melanin and DNA-metal complexes. There, I learned to be an independent researcher, as undergraduates in the lab are given their own projects while also helping more senior members with their work. My project culminated in an honors undergraduate thesis that reported the supramolecular assembly of nucleobase-metal polymers using a reporter dye. This dye had not been used in such a way prior to my work. This thesis project is in preparation for a publication on which I will be a co-first author. In helping senior members, I also co-authored a paper on the photophysics of a DNA-silver(I) complex. In addition to pursuing my own scientific goals, I began working as a chemistry tutor during my junior year to teach the subject to >30 younger students. I found this particularly rewarding when I saw their expression change in the instant when they made sense of a difficult concept, causing a transition from frustration to intrigue. Not only did I help them with their course work, I also encouraged students to reach out to me if they needed help with course selection or career advice. During my last semester at Ohio State, I took an introductory biochemistry course, and this was the beginning of a small, but significant, shift in my scientific career. I found the core concepts of the class intriguing, and as such, when I applied to graduate school, I applied for biophysical chemistry programs. I enrolled as a graduate student in biophysical chemistry at the University of Pennsylvania to obtain a PhD and pursue my passion. After rotating in labs which use a variety of biophysical methods, I decided to join the lab of Dr. Roberto Dominguez, who uses structural biology and an array of other biophysical methods to study the actin cytoskeleton. Thus far my work in the group has been centered on interactions between F-actin and actin binding proteins that regulate cell motility and proliferation. The transition from a physical chemist to a biophysical chemist has been challenging, despite the seemingly subtle difference. I have acquired many new skills in my time at Penn, but my experience as an independent undergraduate researcher helped me persevere and find a new, refined version of my passion for molecular science. As I grow as a scientist, I aim to do impactful work by making key discoveries as well as by instilling my passion for biochemistry in younger students, just like my grandfather did for me.

B. Positions and Honors

Positions and Employment

2020-2023: Undergraduate Researcher at The Ohio State University
2021: General Chemistry Lab Teaching Assistant at The Ohio State University
2022-Present: Chemistry Tutor at "Tutoring by a College Professor"
2023-2024: Chemistry and Biochemistry Teaching Assistant at University of Pennsylvania

Professional Memberships:

2022-Present: American Chemical Society
2024-Present: Biophysical Society

C. Contributions to Science

In the lab of Dr. Bern Kohler, I conducted research aimed at uncovering and characterizing novel DNA-metal complexes. During my time in the lab, I worked on two distinct projects. One project examined the photophysical properties of a non-canonical cytosine-cytosine base pair between adjacent single stranded dC₂₀ DNA strands. This interaction is made possible by silver ions. My contributions to this work were included in a recent publication in the Journal of the American Chemical Society. This publication is particularly intriguing because it showed a rare triplet excited state in a DNA duplex. In addition to my work on DNA complexes, my undergraduate thesis work was focused on the non-canonical nucleobase, 2-aminopurine, and its ability to form linear polymers and nanofibers in solution. Using a myriad of spectroscopic techniques, I studied the photophysical changes in 2-aminopurine because of metal binding, as well as characterizing thermodynamic and kinetic parameters of supramolecular assembly. Further, I was able to use a rotor dye, thiazole orange, to show that π -stacking is an integral motif in these nano assemblies. This was one of the first known uses of thiazole orange on assemblies lacking a covalent backbone. This project culminated in my honors undergraduate thesis and will result in a co-first author publication.

1. Martínez-Fernández, L.; Kohl, F. R.; Zhang, Y.; Ghosh, S.; Saks, A. J.; Kohler, B. Triplet Excimer Formation in a DNA Duplex with Silver Ion-Mediated Base Pairs. *J. Am. Chem. Soc.* **2024**. <https://doi.org/10.1021/jacs.3c08793>.

D. Scholastic Performance

| YEAR | COURSE TITLE | GRADE |
|--|---|-------|
| THE OHIO STATE UNIVERSITY – CUMULATIVE GPA: 3.60 | | |
| 2019 | Arts and Sciences College Survey | S |
| 2019 | First-Year Seminar | S |
| 2019 | Honors General Chemistry I | A |
| 2019 | Calculus 3 | B |
| 2019 | Spanish 3 | A- |
| 2020 | Biology: Energy Transfer and Development | B+ |
| 2020 | Honors General Chemistry II | B+ |
| 2020 | Honors Principles of Macroeconomics | B+ |
| 2020 | Spanish 4 | A- |
| 2020 | English: Language, Identity, and Culture in the U.S. Experience | A |
| 2020 | Ordinary and Partial Differential Equations | A |
| 2020 | Honors Organic Chemistry I | A- |
| 2020 | Organic Chemistry Lab I | A- |
| 2020 | Intro to World Cinema | A |

| YEAR | COURSE TITLE | GRADE |
|---|--|-------|
| 2020 | Physics: Electricity, Magnetism, Optics, and Quantum Mechanics | B+ |
| 2021 | Quantitative Chemical Analysis | A |
| 2021 | Organic Chemistry II | A- |
| 2021 | Organic Chemistry Lab II | A |
| 2021 | Linear Algebra | B+ |
| 2021 | Inorganic Chemistry | B+ |
| 2021 | Physical Chemistry I | B+ |
| 2021 | Honors Undergraduate Research | A |
| 2021 | Foundations of Higher Mathematics | B- |
| 2021 | Introduction to Social Psychology | A- |
| 2022 | Physical Chemistry II | A- |
| 2022 | Physical Chemistry Lab | A |
| 2022 | Instrumental Chemical Analysis | A |
| 2022 | Quantitative Neuroscience | A |
| 2022 | Honors Undergraduate Research | A |
| 2022 | Instrumental Analysis Lab | A- |
| 2022 | Chemical Kinetics | A- |
| 2022 | Mathematics: Dynamical Systems | B+ |
| 2022 | Honors Russian Literature | B+ |
| 2022 | Honors Undergraduate Thesis | A |
| 2023 | Introduction to Biological Chemistry | B+ |
| 2023 | Honors Undergraduate Thesis | B+ |
| 2023 | Honors History of East Asian Art | B |
| 2023 | History: Science and Society in Early Modern Europe | A- |
| 2023 | Golf 1 | A |
| UNIVERSITY OF PENNSYLVANIA – CUMULATIVE GPA: 3.43 | | |
| 2023 | Statistical Mechanics I | B |
| 2023 | Biological Chemistry I | B |
| 2023 | Chemical Information for Biological Chemists | B+ |
| 2023 | Lab Rotation in Chemistry | A |
| 2023 | Lab Rotation in Chemistry | A |
| 2024 | Biological Chemistry II | B- |
| 2024 | Structural and Mechanistic Biochemistry | A |
| 2024 | Pre-Dissertation Lab | A+ |