Emil I. Jaffal

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Education

City University of New York, The Graduate Center — Expected 2028
Ph.D., Chemistry
Advisor: Dr. Anton Oliynyk

Fordham University, Fordham College at Rose Hill — Aug 2019 – May 2023
B.Sc., Chemistry

Research experience

Ph.D. Student — *New York, NY*
City University of New York, Hunter College — Jul 2024 – Present

Solid-State Chemistry Laboratory, Dr. Anton Oliynyk

- Conducting exploratory syntheses of novel intermetallic materials with corresponding analyses using powder X-ray diffraction and scanning electron microscopy.
- Enhancing machine learning applications to predict properties of various binary and ternary compounds, focusing on improving interpretability and predictive capabilities of models in solid-state materials by incorporating detailed structural information.
- Mentoring a handful of students in the lab, providing guidance in research projects and experimental/computational techniques.

Undergraduate Researcher — *Bronx, NY*
Fordham University — Sep 2021 – May 2023

Organic/Materials Chemistry Laboratory, Dr. Julia Schneider

- Steered materials research involving various reactions as part of a novel multi-step synthesis to create organic semiconductors (OSCs) with tunable conjugated heterocycles to improve conductivity.
- Instrumentation experience includes handling UV-Vis, NMR, fluorescence, and IR spectroscopy with respective machinery and analytic interpretations. General synthesis and purification skills include distillations, extractions, filtrations, and recrystallizations.

Computational Chemistry Laboratory, Dr. Joshua Schrier

- Identified probable transition states of novel syntheses as part of a collaboration within the chemistry department.
- Performed numerous Gaussian ab initio calculations of internal energies, electronic structures, and geometric data using density functional theory to analyze reaction thermodynamics and predict isomer formations of OSCs.

Professional experience

Research chemist — *Tarrytown, NY*
ICL Industrial Products — Sep 2023 – Jul 2024

- Synthetic expertise includes developing various novel flame retardant blends for polyurethane foams with external manufacturers and customer additives while ensuring compliance with international safety regulations.
- Pioneered the integration of polyurethane for battery encapsulation, contributing to cutting-edge advancements in environmentally conscious and technologically innovative materials, leading to a

patent application.

- Executed laboratory experiments aligning with market support and new product development objectives.
- Conducted standardized flammability and physical property tests to assess the performance of various halogenated and nonhalogenated flame retardant products.

Publications

Composition and Structure Analyzer/Featurizer for Explainable ML Models to Predict Solid State Structures. Digital Discovery. DOI: 10.1039/D4DD00332B — Jan 2025

Jaffal E.I., Shiryaev D., Vtorov A., Lee S., Barua N.K. & Oliynyk A.O.

Synthesis of Pyrene Diimide Isomers with Tunable Excimer Formation. Organic Letters. DOI: 10.1021/acs.orglett.4c03523 — Jan 2025

Johnston K., McCostis A., Mikita E., **Jaffal E.** & Schneider J.A.

Presentations

Brookhaven Lab Nuclear Chemistry Summer School – *New York, NY* — Jul 2024

The Oliynyk Lab

Fordham University Jean Dreyfus Lectureship – *Bronx, NY* — Apr 2023

The Schneider Lab

MAPS: Research at Fordham – *Bronx, NY* — Nov 2022

Vinyl Azide Cyclization: Where Organic and Computational Chemistry Meet

Contributed presentations

*indicates an upcoming presentation

***Canadian Chemistry Conference & Exhibition** – *Ottawa, ON* — June 2025

Excimer formation and anti-Kasha emission in new pyrene diimide isomers

Materials Research Society Meeting and Exhibit – *Boston, MA* — Nov 2023

Effect of Backbone Linearity on Mixed-Conductance in New Pyrene Dianhydride-Based Conjugated Ladder Polymers

Posters

Gordon Research Conference – *Newry, ME* — Jul 2024

Materials Informatics: Binary/Ternary Composition and Structure Featurizer for ML Models

Projects

Composition Analyzer/Featurizer (CAF) — Jun 2024

Developed an interactive Python script that generates chemical compositional features and provides tools for filtering, sorting, and merging data. Aids novice solid-state chemists and materials scientists in generating compositional training data ranging from dozens to tens of thousands of compounds.

Patents

Heat Resistant Semi-Rigid Polyurethane Foams. *Provisional patent #63/680,764*. — Aug 2024

Emil Jaffal, Sergei Levchik, Zhihao Chen, Jeffrey Stowell & Munjal Patel.

Honors and Grants

CUNY Certificate of Achievement 2025

Recognized for outstanding success as a first year graduate student and submitting my first publication during the Fall 2024 semester.

CUNY Science Scholarship 2024

Fordham University Dean's List 2023

NSF Summer Research Funding Grant (DMR-1928882) 2022

Service

Fordham University Muslim Students Association – *Treasurer* Sep 2022 – May 2023

Fordham University Arabic Club – *Vice President* Jan 2022 – Aug 2022

Fordham Undergraduate Research Journal – *Peer Editor* Sep 2022 – May 2023

Memberships

Sigma Xi, The Scientific Research Honor Society – *Associate Member* Mar 2023 – Present

Technical skills

Software: Bluehill, ChemOffice, Gaussian16, Mathematica, Maestro, Microsoft Office, Signals Notebook, TopSpin, VASP, WebMO.
Programming languages: Python, Bash, Wolfram.
Packages: NumPy, SciPy, Scikit-Learn, Pandas, Matplotlib.
Languages: Arabic (native), English (native), Spanish (conversational).