NATHAN MANCHEUN LUI

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EDUCATION

Cornell University — **Ithaca, NY, USA**
Doctor of Philosophy in Chemistry — Candidate
Master of Science in Chemistry — Dec 2020
Advisor: Professor David B. Collum
Thesis: **Structure and reactivity of the Oppolzer enolates**
Field: Physical and computational organic chemistry
Minor: Computer science (Concentration: Machine Learning)

New York University Abu Dhabi — **Abu Dhabi, AD, UAE**
Bachelor of Science in Chemistry with specialization in Biochemistry — May 2018
Advisors: Professors Wael Rabeh and Panče Naumov
Thesis: **Conserved loops mediate the active site microenvironment and determine the color of bioluminescence in beetle luciferases**
Field: Physical and Structural Biochemistry
Minor: Urban Studies

RESEARCH

The Collum Group — **Cornell University, NY, USA**
Graduate Research Assistant — Aug 2018 – Present
Advisor: Professor David B. Collum
Structure and reactivity of the Oppolzer enolates
A new series of highly soluble organosodium bases with wide-ranging synthetic applications

The Rabeh Lab — **New York University Abu Dhabi, AD, UAE**
Undergraduate Researcher — Oct 2016 – Jul 2018
Advisor: Professor Wael Rabeh
Beetle luciferases with naturally red- and blue-shifted emission

Naumov Smart Materials Lab — **New York University Abu Dhabi, AD, UAE**
Undergraduate Researcher — May 2016 – Aug 2018
Advisor: Professor Panče Naumov
Thermochemiluminescent peroxide crystals
pH-Dependent fluorescence from firefly oxyluciferin in agarose thin films

The Rivera Lab — **University of Puerto Rico - Río Piedras, San Juan, PR, USA**
Visiting Scholar, NSF - REU program — Summer 2017
Advisor: Professor José Rivera
Hierarchical assembly of supramolecular G-quadruplexes via enzyme-instructed self-assembly

PUBLICATIONS

Ma, Y., **Lui, N.M.,** Keresztes, I., Woltornist, R.A., Collum, D.B. "Sodium Isopropyl(trimethylsilyl)amide (NaPTA): A Stable and Highly Soluble Lithium Diisopropylamide Mimic." *Manuscript accepted for publication in the Journal of Organic Chemistry*.

Al-Handawi, M.B., Polavaram, S., Kurlevskaya, A., Commins, P., Schramm, S., Carrasco-López, C., **Lui, N.M.,** Solntsev, K. M., Laptenok, S.P., Navizet, I., Naumov, P. "Spectrochemistry of Firefly Bioluminescence." *Chemical Reviews* **2022**, *ASAP*.

Carrasco-López, C., **Lui, N.M.,** Schramm, S., Naumov, P. "The elusive relationship between structure and colour emission in beetle luciferases." *Nature Reviews Chemistry* **2021**, *5* (1), 4.
-This article was featured on the cover of the January 2021 issue of *Nature Reviews Chemistry*.

Schramm, S., Karothu, D.P., **Lui, N.M.,** Commins, P., Ahmed, E., Catalano, L., Li, L., Weston, J., Moriwaki, T., Solntsev, K. M., Naumov, P. "Thermochemiluminescent Peroxide Crystals." *Nature Communications* **2019**, *10* (1), 997.

Lui, N.M., Schramm S., Naumov P. "pH-dependent fluorescence from firefly oxyluciferin in agarose thin films." *New Journal of Chemistry* **2019**, *43* (3), 1122.

-An abridged version of this paper was selected for an oral presentation at the 5th UAE Undergraduate Research Competition under the title "Humidity responsive luminescent switching in oxyluciferin-agarose thin films as a basis for optical humidity sensors."

Carrasco-López, C., Ferreira, J., **Lui, N.M.,** Schramm, S., Berraud-Pache, R., Navizet, I., Panjikar, S., Naumov, P., Rabeh, W. "Beetle luciferases with naturally red- and blue-shifted emission." *Life Science Alliance* **2018**, *1* (4), e201800072.

-Selected for spotlight talk at 2018 ISBC General Meeting (top abstract in section)

-Selected for Sci-Mix at the 255th ACS General Meeting (top 20 abstracts in biological chemistry division)

MANUSCRIPTS IN REVIEW

Lui, NM., MacMillan, S.N., Collum, D.B. "Lithiated Oppolzer Enolates: Solution Structures, Mechanism of Alkylation, and the Origin of Stereoselectivity." *Manuscript under submission at the Journal of American Chemical Society.*

-Selected for talk at 2022 ACS Fall General Meeting

HONORS, GRANTS, AND AWARDS

ACS General Meeting Technical Session Chair 2022 • **Simon Bauer Scholarship Award** 2022 • **ACS/Covestro Graduate Teaching Award** 2020 • **ACS International Undergraduate Travel Grant** 2018 • **NYUAD Conference Travel Grants** 2018/2017 • **PR-CLIMB Travel Grant** 2017 • **NYUAD Capstone Research Grant** 2017 • **NSF-REU Award** 2017

TEACHING

CHEM 7680 Advanced Physical Organic Chemistry (2023) • **CHEM 2510** Introduction to Experimental Organic Chemistry (2019-2020) • **CHEM 2070** General Chemistry I – Laboratory (2018)

RELEVANT COURSEWORK

Transcripts available upon request

CHEM-UH 2010/3010 Organic Chemistry I/II • **CHEM-UH 3011/13/14** Physical Chemistry I/II • **CHEM-UH 3015** Inorganic Chemistry • **CHEM-UH 3016** Analytical Chemistry • **CHEM-UH 3020/21/22** Biochemistry I/II

BIOMG 6310 Protein Structure & Function • **CHEM 6250** Advanced Analytical Chemistry • **CHEM 6650** Advanced Physical Organic Chemistry • **CHEM 6660** Synthetic Organic Chemistry • **CHEME 6880** Industrial Big Data and Machine Learning • **CS 2110/11** Object Oriented Programming & Data Structures + Programming Practicum • **CS 5777** Principles of Large-Scale Machine Learning Systems • **CS 5780** Introduction to Machine Learning • **CS 6784** Advanced Topics in Machine Learning – Deep Learning