

Leo Gordon

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LinkedIn | Personal Website | GitHub

EDUCATION

THE CITY COLLEGE OF NEW YORK (CCNY) | PhD, Chemical Engineering
Expected Graduation 2023 | New York, NY

THE CITY COLLEGE OF NEW YORK (CCNY) | MPhil, Chemical Engineering
Graduated January 2021 | New York, NY • Cum. GPA: 3.70

UNIVERSITY OF EDINBURGH | MChem, Chemistry
Graduated July 2017 | Edinburgh, U.K.

CURRENT RESEARCH

MESSINGER LAB | PhD Student

CCNY | November 2018 – Present | New York, NY

- Working in collaboration with the John Lab (Department of Chemistry, CCNY) to implement novel organic molecules as electrode materials in rechargeable aluminum batteries. The primary aim is to develop a molecular level understanding of the charge storage mechanisms involved primarily using solid-state NMR, alongside other characterization techniques such as XRD.
- Evaluation of P_2O_5 -modified $LiPF_6$ carbonate electrolyte via NMR. The modification process improves rechargeable lithium metal battery performance and cycle life.
- Investigation has been started into the interphase layer on aluminum metal anodes to enable their use in aqueous electrolyte systems, or other electrolytes which have poor performance with aluminum electrodes.

RESEARCH EXPERIENCE

BIDDINGER LAB | Summer Researcher

CCNY | Summer 2018 | New York, NY

- Performed preliminary study of surface enhanced FTIR analysis usage for *in situ, operando* investigation of reaction intermediates in electrochemical bio-oil upgrading
- Responsible for equipment such as GC-MS and FTIR spectrometer

KAMPOURIS LAB | Masters Research

University of Edinburgh | September 2016 - April 2017 | Edinburgh, U.K.

- Masters thesis entitled "An Investigation into the Effects of Pairing Working Electrodes and Reference Electrodes in a Screen-Printed Multimicroelectrode Array"
- Investigated the design of microelectrode arrays, in particular the impact of reference electrode positioning
- Employed the screen-printing technique to produce stacked, one-dimensional microelectrode arrays of working electrodes and coupled reference electrodes
- Worked extensively in the clean-room environment within the Scottish Microelectronics Centre

LUSBY LAB | Honors Research

University of Edinburgh | Spring 2016 | Edinburgh, U.K.

- Performed synthetic development and characterization of prototypical tethered molecular cage systems for the encapsulation of reactants and prolonged analysis

ROBERTSON LAB | Honors Research

University of Edinburgh | Fall 2015 | Edinburgh, U.K.

- Developed dye-sensitized solar cell devices using anthrocyanin dyes, and a non-corrosive redox couple

LEADERSHIP & WORK EXPERIENCE

TREASURER | ECS Student Chapter

ECS | 2021-present | New York, NY

- Key leadership position organizing and running events pertaining to electrochemistry

EXECUTIVE COMMITTEE - TREASURER | Graduate Student Council

CCNY | Academic Year 2019-2020 | New York, NY

- Created budgets to fund all graduate clubs on campus, and host a graduate student symposium
- Held office hours to meet with graduate students and address concerns
- Reworked all budgeting to match the new financial conditions brought by the COVID-19 pandemic

TEACHING ASSISTANT FOR THERMODYNAMICS I & II | Department of Chemical Engineering

CCNY | Spring 2020-present | New York, NY

- Delivered lectures to classes and performed weekly recitations to class of 75 people
- Addressed concerns and questions of the class through individual emails and Zoom calls
- Reevaluated teaching approach due to the COVID-19 pandemic, utilizing virtual media

TECHNICAL SPECIALIST | Genius Bar

Apple Inc. | 2014-2017 | Edinburgh, U.K.

- Troubleshooted customer issues and performed device repairs
- Aligned with customers, establishing mutual empathy to de-escalate situations

AWARDS AND SCHOLARSHIPS

EXPERIMENTAL NUCLEAR MAGNETIC RESONANCE CONFERENCE TRAVEL AWARD

ENC | April 2022 | Orlando, FL

GROVE SCHOOL OF ENGINEERING FELLOWSHIP

CCNY | Academic Year 2020-2021 | New York, NY

ACRIVOS FELLOWSHIP

CCNY | Academic Year 2018-2019 | New York, NY

LANGUAGES

SPOKEN & WRITTEN

Native proficiency :

English

Intermediate proficiency:

German

PROGRAMMING

High Proficiency:

Matlab

Basic Proficiency:

Python, HTML

REFERENCES

PROF. ROBERT J. MESSINGER

CCNY

Steinman Hall, Room 327,

160 Convent Ave.,

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PUBLICATIONS

- [1] Leo W. Gordon, Ankur L. Jadhav, Mikhail Miroshnikov, Theresa Schoetz, George John, and Robert J. Messinger. Molecular-scale elucidation of ionic charge storage mechanisms in rechargeable aluminum-quinone batteries. *Journal of Physical Chemistry C*, August 2022.
- [2] Jian Zhang, Jiayan Shi, Leo W. Gordon, Nastaran Shojarazavi, Xiaoyu Wen, Yifan Zhao, Jianjun Chen, Chi-Cheung Su, Robert J. Messinger, and Juchen Guo. Performance leap of lithium metal batteries in LiPF₆ carbonate electrolyte by a phosphorus pentoxide acid scavenger. *ACS Applied Materials & Interfaces*, 14(32):36679–36687, 08 2022.
- [3] Rahul Jay, Ankur L. Jadhav, Leo W. Gordon, and Robert J. Messinger. Soluble electrolyte-coordinated sulfide species revealed in Al-S batteries by nuclear magnetic resonance spectroscopy. *Chemistry of Materials*, 34:4486–4495, 5 2022.
- [4] T. Schoetz, L.W. Gordon, S. Ivanov, A. Bund, D. Mandler, and R.J. Messinger. Disentangling faradaic, pseudocapacitive, and capacitive charge storage: A tutorial for the characterization of batteries, supercapacitors, and hybrid systems. *Electrochimica Acta*, page 140072, February 2022.

CONFERENCE PRESENTATIONS

ROCKY MOUNTAIN CONFERENCE (RMC) ON MAGNETIC RESONANCE | July 2022

“Electrochemical Complexation of Polyatomic Aluminum Ions to Heterogeneous Organic Electrode Samples Investigated Using Solid-State Dipolar-Mediated NMR Methods,” Rocky Mountain Conference on Magnetic Resonance (RMC), 25-29 July 2022, Copper Mountain, CO. [Poster]

EXPERIMENTAL NUCLEAR MAGNETIC RESONANCE (ENC) CONFERENCE | April 2022

“Molecular Structures of Reaction Products in LiPF₆ Carbonate Electrolyte with a Phosphorous Pentoxide Scavenger for Rechargeable Lithium Metal Batteries,” Experimental Nuclear Magnetic Resonance Conference (ENC), 24-29 April 2022, Orlando, FL. [Poster]

AMERICAN INSTITUTE FOR CHEMICAL ENGINEERS (AIChE) CONFERENCE | November 2021

“Charge Storage Mechanisms of Quinone- & Flavin-Type Organic Electrodes for Rechargeable Aluminum Batteries Elucidated with Molecular-level Specificity,” AIChE Annual Meeting, 7-12 Nov. 2021, Boston, MA. [Oral]

ELECTROCHEMICAL SOCIETY (ECS) MEETING | October 2021

“Electrochemical Complexation of Polyatomic Aluminum Cations in Quinone-type Organic Battery Electrodes Revealed by Solid-state NMR,” Electrochemical Society (ECS) Meeting, 10-14 Oct. 2020, Virtual. [Poster]

EXPERIMENTAL NUCLEAR MAGNETIC RESONANCE (ENC) CONFERENCE | March 2021

“Molecular-level Insights into the Charge Storage Mechanisms of Rechargeable Aluminum-Indanthrone Quinone Batteries Revealed by Solid-state NMR Spectroscopy,” Experimental Nuclear Magnetic Resonance Conference (ENC), 29-31 March 2021, Virtual. [Poster]

BATTERY & ENERGY STORAGE (BES) WORKSHOP | October 2020

“Molecular-level Investigation into the Charge-storage Mechanisms of Rechargeable Aluminum-organic Batteries,” Battery and Energy Storage (BES) Workshop, 21-23 October 2020, Virtual. [Poster]

ELECTROCHEMICAL SOCIETY (ECS) MEETING | October 2020

“Molecular-Scale Understanding of Charge Storage Mechanisms in Organic Positive Electrode Materials for Rechargeable Aluminum Batteries,” Electrochemical Society (ECS) Meeting, 4-9 October, 2020, Virtual. [Poster]

BATTERY & ENERGY STORAGE (BES) WORKSHOP | October 2019

“Rechargeable Aluminum Batteries Using Organic Cathode Materials with High Cycle Life and Capacity,” Battery and Energy Storage (BES) Workshop, 21-22 October, 2019, New York, NY, USA. [Poster]