Leo Gordon

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LinkedIn | Personal Website | GitHub

EDUCATION

THE CITY COLLEGE OF NEW YORK (CCNY) | PhD, Chemical Engineering
Expected Graduation Spring 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.

RESEARCH ACTIVITIES

MESSINGER LAB | PhD Student
CCNY | November 2018 – Present | New York, NY

- Applying advanced solid-state NMR methodologies to establish ionic and electronic charge storage mechanisms in quinone electrodes for aluminum batteries
- NMR characterization of molten-salt electrolytes in liquid and heterogeneous samples to develop understanding of reaction processes following electrochemical cycling
- Quantum chemical calculations to determine thermochemical viability of ion generation pathways and quadrupolar NMR parameters of electroactive ions
- Evaluating reaction schemes via NMR to characterize the modification of $LiPF_6$ by P_2O_5 for long-life and low hysteresis lithium-metal batteries
- Investigation into chalcogen electrodes for rechargeable aluminum batteries, studying the impacts of structure at different length-scales to the resultant reactions

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 producing 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 reactant molecules and their 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 as alternatives to high-cost and long-life solar devices

LEADERSHIP & WORK EXPERIENCE

TREASURER | ECS Student Chapter
ECS | 2021-2023 | 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
- 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-Spring 2022 | 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
- Reevaluted 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 FELLOWSHIPS

242ND ELECTROCHEMICAL SOCIETY MEETING TRAVEL AWARD
ECS | October 2022 | Atlanta, GA

GLOBAL NMR TWITTER CONFERENCE 2022 POSTER AWARD
Global NMR Discussions | August 2022 | Twitter

ROCKY MOUNTAIN CONFERENCE (RMC) ON MAGNETIC RESONANCE TRAVEL AWARD
RMC | July 2022 | Copper Mountain, CO

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
English - Native
German - Intermediate

PROGRAMMING
Matlab, Python - Proficient
HTML - Basic

REFERENCES

PROF. ROBERT J. MESSINGER
CCNY
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PUBLICATIONS

[1] Leo W Gordon, Jonah Wang, and Robert J Messinger. Revealing impacts of electrolyte speciation on ionic charge storage in aluminum-quinone batteries by NMR spectroscopy. ***Journal of Magnetic Resonance***, 348:107374, mar 2023.

[2] Atanu Roy, Theresa Schoetz, Leo W. Gordon, Hung-Ju Yen, Qingli Hao, and Daniel Mandler. Formation of a CoMn-layered double hydroxide/graphite supercapacitor by a single electrochemical step. ***ChemSusChem***, e202201418, Aug 2022.

[3] 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. ***The Journal of Physical Chemistry C***, 126:14082–14093, Aug 2022.

[4] 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 $LiPF_6$ carbonate electrolyte by a phosphorus pentoxide acid scavenger. ***ACS Applied Materials & Interfaces***, 14:36679–36687, Aug 2022.

[5] 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, May 2022.

[6] 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***, 412:140072, Feb 2022.

CONFERENCE PRESENTATIONS

BATTERY & ENERGY STORAGE (BES) CONFERENCE | October 2022
"Impacts of Electrolyte Speciation on Aluminum-Organic Battery Charge Storage," Battery and Energy Storage (BES) Workshop, 26-28 October, 2022, New York, NY, USA.

ELECTROCHEMICAL SOCIETY (ECS) MEETING | October 2022
"Understanding Improved Lifetimes of Lithium-Metal Batteries $LiPF_6$ Carbonate Electrolyte Modified by Phosphorus Pentoxide," Electrochemical Society (ECS) Meeting, 9-13 Oct. 2022, Atlanta, GA.

GLOBAL NMR TWITTER CONFERENCE | August 2022
"Electrochemical Complexation of Polyatomic Aluminum Ions to Heterogeneous Organic Electrode Samples Investigated Using Solid-State Dipolar-Mediated NMR Methods," Global NMR Twitter Conference, 3-5 August 2022, Virtual.

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.

EXPERIMENTAL NUCLEAR MAGNETIC RESONANCE (ENC) CONFERENCE | April 2022
"Molecular Structures of Reaction Products in $LiPF_6$ Carbonate Electrolyte with a Phosphorous Pentoxide Scavenger for Rechargeable Lithium Metal Batteries," Experimental Nuclear Magnetic Resonance Conference (ENC), 24-29 April 2022, Orlando, FL.

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.

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. 2021, Virtual.

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.

BATTERY & ENERGY STORAGE (BES) CONFERENCE | 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.

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.

BATTERY & ENERGY STORAGE (BES) CONFERENCE | 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.