

Ruocun (John) Wang

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EDUCATION

North Carolina State University, Raleigh, NC, U.S.	07/2020
Ph.D. in Materials Science & Engineering Advisor: Prof. Veronica Augustyn	
Purdue University, West Lafayette, IN, U.S.	05/2015
B.S. with distinction in Materials Science & Engineering Minor in Global Engineering Studies	
Study Abroad, Imperial College London, London, UK	Spring 2014

PROFESSIONAL EXPERIENCE

Research Associate I, Drexel University, Advisor: Yury Gogotsi	07/2023 – present
Cotswold Foundation Postdoctoral Fellow, Drexel University, Advisor: Yury Gogotsi	01/2023 – 07/2023
Postdoctoral Fellow, Drexel University, Advisor: Yury Gogotsi	01/2021 – 01/2023
Postdoctoral Fellow, North Carolina State University, Advisor: Veronica Augustyn	08/2020 – 12/2020
Graduate Research Assistant, North Carolina State University, Advisor: Veronica Augustyn	08/2015 – 07/2020
Undergraduate Research Assistant, Purdue University, Advisor: John A. Howarter	06/2012 – 05/2015

AWARDS & HONORS

ECS Colin Garfield Fink Summer Fellowship, the Electrochemical Society (only one is awarded annually)	2023
Participant, 2023 Auburn Preparing Future Faculty Program	2023
Drexel People's Choice Award, NanoArtography	2022
2023 Cotswold Foundation Postdoctoral Fellowship, The Cotswold Foundation	2022
Participant, 2021 Telluride School on Interfacial Chemistry and Charge Transfer for Energy Storage and Conversion	2021
Student Poster 1st Prize, 2019 Carolina Science Symposium	2019
Overall Grand Prize, 2019 Triangle Student Research Competition	2019
ECS Battery Division Student Slam 3 Best Paper Award, 235th ECS Meeting	2019
ECS Data Science Hack Week Travel Support, the Army Research Office	2019
The Bob and Suester Sowell Travel Fellowship, NC State Grad School	2019
2nd place at the 2019 Graduate Student Research Symposium in Engineering, NC State Grad School	2019
American Society of Microscopy Travel Award, American Society of Microscopy	2017
Participant, 2017 Next Generation Electrochemistry Research Institute, University of Illinois at Chicago	2017
2nd Place at MRS 2016 Spring Meeting "Sustainability in My Community" Competition, Materials Research Society	2016
NCSU CoE Professional Development Travel Award, NCSU College of Engineering	2016
John L. Bray Memorial Award, Purdue School of Materials Engineering	2015
Matthew Slone Academic Excellence Scholarship, Purdue School of Materials Engineering	2014
Industrial Roundtable Scholarship, Purdue Engineering Student Council	2014
Study Abroad Scholarship, Purdue Study Abroad Office	2013
MSE General Scholarship, Purdue School of Materials Engineering	2013
ASM Muncie Chapter Scholarship, American Society for Metals Muncie Chapter	2013
Alcoa Foundation Scholarship, Purdue School of Materials Engineering	2012
One Brick Higher Award, Purdue University	2012

PUBLICATIONS

1. **R. Wang**, M. Anayee, M.N. Naseer, T. Zhang, Y. Zhang, M. Shekhirev, K. Shevchuk, Y.-J. Hu, Y. Gogotsi, “Stability of Pseudocapacitive Energy Storage in $\text{Ti}_3\text{C}_2\text{T}_x$ MXene in a Wide Temperature Range” *in preparation*
2. **R. Wang**, R. Unocic, Y. Burets, T.-W. Tsai, J. Weiss, Y. Gogotsi, “Cryogenic Transimission Electron Microscopy Reveals Amorphous Lithium Metal Nucleation on MXenes” *in preparation*
3. **R. Wang**, Driving the Research Ecosystem, in “Voices: Nanomaterials in the future of energy research” *Cell Reports Physical Science* (2023) (invited)
4. M. Saraf, B. Chacon, S. Ippolito, R.W. Lord, M. Anayee, **R. Wang**, A. Inman, C.E. Shuck, Y. Gogotsi, “Enhancing Charge Storage of $\text{Mo}_2\text{Ti}_2\text{C}_3$ MXene by Partial Oxidation” *Advanced Functional Materials* (2023).
5. M. Downes, C.E. Shuck, R. Lord, M. Anayee, M. Shekhirev, **R. Wang**, T. Hryhorchuk, M. Dahlqvist, J. Rosen, Y. Gogotsi, “ M_5X_4 -A Family of MXenes” *ACS Nano*, **17** (2023) 17158–17168.
6. M. H. M. Facure, K. Matthews, **R. Wang**, R. W. Lord, D. S. Correa, Y. Gogotsi, “Pillaring Effect of Nanodiamonds and Expanded Voltage Window of $\text{Ti}_3\text{C}_2\text{T}_x$ Supercapacitors in AlCl_3 Electrolyte” *Energy Storage Materials*, **61** (2023) 102919.
7. S. Vorotilo, C. E. Shuck, M. Anayee, M. Shekhirev, K. Matthews, R. W. Lord, **R. Wang**, I. Roslyk, V. Balitskiy, V. Zahorodna, O. Gogotsi, Y. Gogotsi, “Affordable Combustion Synthesis of V_2AlC Precursor for V_2CT_x MXene” *Graphene and 2D Materials* (2023).
8. D. Zhang*, **R. Wang***, X. Wang, Y. Gogotsi, “*In situ* monitoring redox processes in energy storage using UV-Vis spectroscopy” *Nature Energy*, **8** (2023) 567–576. (* equal contributions)
9. M. Han, D. Zhang, C.E. Shuck, B. McBride, T. Zhang, **R. Wang**, K. Shevchuk, Y. Gogotsi, “Electrochemically Modulated Interaction of MXenes with Microwaves” *Nature Nanotechnology*, **18** (2023) 373–379.
10. C.A. Inman, T. Hryhorchuk, L. Bi, **R. Wang**, B. Greenspan, T. Tabb, E.M. Gallo, A. VahidMohammadi, G. Dion, A. Danielsecu, Y. Gogotsi, “Wearable energy storage with MXene textile supercapacitors for real world use” *Journal of Materials Chemistry A*, **11** (2023) 3514–3523.
11. M. Anayee, C. Shuck, M. Shekhirev, A. Goad, **R. Wang**, Y. Gogotsi, “Kinetics of Ti_3AlC_2 etching for $\text{Ti}_3\text{C}_2\text{T}_x$ MXene Synthesis” *Chemistry of Materials*, **34** (2022) 9589–9600.
12. J. Mitchell, **R. Wang**, J. Ko, J.W. Long, V. Augustyn, “Critical Role of Structural Water for Enhanced Li^+ Insertion Kinetics in Crystalline Tungsten Oxides” *Journal of The Electrochemical Society*, **169** (2022) 030534.
13. S. Saeed, S. Boyd, W.Y. Tsai, **R. Wang**, N. Balke, V. Augustyn, “Understanding electrochemical cation insertion into Prussian Blue from electrode deformation and mass changes.” *Chemical Communications*, **57** (2021) 6744–6747.
14. W.Y. Tsai, **R. Wang**, S. Boyd, V. Augustyn, N. Balke, “Probing local electrochemistry via mechanical cyclic voltammetry curves” *Nano Energy*, **81** (2021) 105592.
15. **R. Wang**, Y. Sun, A. Brady, S. Fleischmann, S. Boyd, M. Spencer, H.-W. Wang, D.-E. Jiang, V. Augustyn, “Fast Proton Insertion in Layered $\text{H}_2\text{W}_2\text{O}_7$ via Selective Etching of an Aurivillius Phase” *Advanced Energy Materials*, (2020) 2003335.
16. V. Augustyn, **R. Wang**, M. Pharr, N. Balke, C. Arnold, “Deformation during Electrosorption and Insertion-Type Charge Storage: Origins, Characterization, and Design of Materials for High Power” *ACS Energy Letters*, **5** (2020) 3548–3559. (Front Cover of the Issue)
17. **R. Wang**, S. Boyd, P.V. Bonnesen, V. Augustyn, “Effect of Water in a Non-Aqueous Electrolyte on Electrochemical Mg^{2+} Insertion into WO_3 ” *Journal of Power Sources*, **477** (2020) 229015. (Special Issue in Celebration of 2019 Nobel Prize in Chemistry)
18. S. Fleischmann, J. Mitchell, **R. Wang**, D.-E. Jiang, V. Presser, V. Augustyn, “Pseudocapacitance: From Fundamental Understanding to High Power Energy Storage Materials” *Chemical Reviews*, **120** (2020) 6738–6782.
19. S. Fleischmann, Y. Sun, N.C. Osti, **R. Wang**, E. Mamontov, D.-E. Jiang, V. Augustyn, “Interlayer separation in hydrogen titanates enables electrochemical proton intercalation” *Journal of Materials Chemistry A*, **8** (2020) 412–421.
20. **R. Wang**, J.B. Mitchell, G. Qiang, W.Y. Tsai, S.K. Boyd, M. Pharr, N. Balke, V. Augustyn, “Operando AFM

- Reveals Mechanics of Structural Water Driven Battery-to-Pseudocapacitor Transition” *ACS Nano*, **12** (2018) 6032–6039.
21. **R. Wang**, C.C. Chung, Y. Liu, J.L. Jones, V. Augustyn, “Electrochemical Intercalation of Mg^{2+} into Anhydrous and Hydrated Crystalline Tungsten Oxides” *Langmuir*, **33** (2017) 9314–9323.
 22. J.S. Daubert, **R. Wang**, J.S. Ovental, H.F. Barton, R. Rajagopalan, V. Augustyn, G.N. Parsons, “Intrinsic Limitation of Atomic Layer Deposition for Pseudocapacitive Metal Oxides in Porous Electrochemical Capacitor Electrodes” *Journal of Materials Chemistry A*, **5** (2017) 13086–13097.
 23. K. Gao, L.T. Kearney, **R. Wang**, J.A. Howarter, “Enhanced Wettability and Transport Control of Ultrafiltration and Reverse Osmosis Membranes with Grafted Polyelectrolytes” *ACS Applied Materials and Interfaces*, **7** (2015) 24839–24847.

PROPOSAL WRITING EXPERIENCE

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|---|------|
| Co-applicant , “Development of Printed Lithium-ion Microbatteries for Compact Rechargeable Hearing Aid Device” Department of Energy, Advanced Materials & Manufacturing Technologies Office 2023 Microbattery Design Prize, <i>Submitted</i> | 2023 |
| Co-applicant , “Resolve the Storage Sites and Quantity of Hydrogen MXenes with Atom Probe Tomography” Oak Ridge National Lab (ORNL), Center for Nanophase Materials Sciences (CNMS) Rapid Access Proposal, <i>Awarded</i> | 2023 |
| Co-applicant , “Quantifying Phase Evolution of Lithium Metal Electrodeposited on MXenes with Identical Location Transmission Electron Microscopy” ORNL, CNMS User Proposal, <i>Awarded</i> | 2021 |
| Co-applicant , “Investigating the Dynamics of Structural Water in Metastable $W_2O_6 \cdot nH_2O$ ($n = 1$ & 2)” Oak Ridge National Lab, Neutron Sciences Proposal, <i>Awarded</i> | 2020 |
| Co-applicant , “Neutron Pair Distribution Function for Local Octahedral Distortion and Proton Site Determination in $W_2O_6 \cdot H_2O$ and $W_2O_6 \cdot 2H_2O$ ” ORNL, Neutron Sciences Proposal, <i>Awarded</i> | 2019 |
| Co-applicant , “Quantifying Electrochemomechanical Relationships of V_2O_5 during Electrochemical Ion Intercalation with <i>Operando</i> AFM” ORNL, CNMS User Proposal, <i>Awarded</i> | 2019 |
| Co-applicant , “Local Structure of Protons in Acetonitrile-based Magnesium-ion Electrolytes with Adsorbed Water” ORNL, CNMS User Proposal, <i>Awarded</i> | 2017 |
| Co-applicant , “Understanding the Mechanism of Cation Intercalation in Hydrated Tungsten Oxide for High Power Energy Storage” ORNL, CNMS User Proposal, <i>Awarded</i> | 2016 |

ORAL PRESENTATIONS

1. **2023 Materials Research Society Spring Meeting**, San Francisco, CA, April 2023.
2. **Nanomaterials Seminar (Invited)**, Drexel University, September 2020.
3. **Energy Storage and Membrane Materials Group Seminar (Invited)**, Oak Ridge National Lab, September 2020.
4. **235th ECS Meeting**, Dallas, TX, May 2019. (2 talks)
5. **Pittcon 2019**, Philadelphia, PA, March 2019.
6. **2018 International Conference of African MRS**, Gaborone, Botswana, December 2017. (2 talks)
7. **2017 Materials Research Society Spring Meeting**, Phoenix, AZ, April 2017.

SELECTED POSTER PRESENTATIONS

1. **2023 Nanomaterials for Applications in Energy Technology Gordon Research Conference**, Ventura, CA, February 2023.
2. **2019 Carolina Science Symposium**, Raleigh, NC, November 2019.
3. **2019 Triangle Student Research Competition**, Raleigh, NC, October 2019.
4. **2019 FIRST EFRC A-Team On-site Meeting**, Raleigh, NC, July 2019.
5. **2018 Batteries Gordon Research Conference**, Ventura, CA, March 2018.

6. **WE-Heraeus-Seminar: *operando* characterization of energy materials**, Bad Honnef, Germany, August 2017.
7. **Center for Dielectrics and Piezoelectrics Spring 2016 meeting**, Kyoto, Japan, June 2016.
8. **MRS Spring 2016 Meeting “Sustainability in My Community” competition**, Phoenix, AZ, March 2016.

TEACHING & MENTORING

Echem Channel, YouTube (09/2020 – present)

- **Content Creator:** Made 21× videos on literature, theory, and experimental practices on energy storage and electrochemistry. The channel has attracted > 5,900 subscribers and collected > 300,000 views as of Oct 2023.

A.J. Drexel Nanomaterials Institute & Department of Materials Science and Engineering, Drexel University

- **Guest Lecturer:** MATE 100 Materials for Emerging Technologies (2-hr-long undergraduate lecture, Fall 2023)
- **Guest Lecturer:** MATE 582 Materials for Energy Storage (3-hr-long graduate lecture, Fall 2022&2023)
- **Teaching Assistant:** ENGR 220 Fundamentals of Materials (undergraduate, Summer 2022)
- **Lab Coordinator & Lecturer:** MATE 280 Advanced Materials Laboratory (undergraduate, Fall 2021, 2022 & 2023)
- **Lecturer:** MXene Course (worldwide): Raman spectroscopy and electrochemistry of MXenes (2021 – present)
- Mentored students and supported visiting scholars
 - *Ph.D. students:* Mark Anayee, Asaph Lee, Teng Zhang, Danzhen Zhang, Lingyi Bi, Kateryna Shevchuk, Geetha Valurouthu, Tetiana Hryhorchuk, and Alex Inman
 - *Master students:* Joshua Gonzalez, Nastya Morozova, and Jaehoon Choi
 - *Undergraduate students:* Marley Downes, Yan Burets, Jake McBride, and Jaxon Weiss
 - *Visiting scholars:* Dr. Esra Kilavuz, Dr. Sevda Saran, Dr. Manav Saxena, Murilo Facure

Department of Materials Science & Engineering, NC State University

- **Mentor:** Undergraduate Research of Hannah Teeters (Fall 2020)
- **Co-mentor:** MSE 423 Introduction to Materials Engineering Design (undergraduate, Fall 2019 – Fall 2020)
- **Teaching Assistant:** MSE 200 Mechanical Properties of Structural Materials (undergraduate, Fall 2015)

SERVICE & LEADERSHIP

2025 Nanomaterials for Applications in Energy Technology Gordon Research Seminar

- **Co-chair:** Elected by the attendees at the 2023 Gordon Research Seminar on the same topic

Women Supporting Women in the Sciences

- **Consultant:** Supported experimental kit designed for K-12 students in East Africa (2021)

Drexel University

- **Judge:** oral, poster, and three-minute thesis presentations at Drexel Emerging Graduate Scholars (DEGS) Conferences and STAR Scholars Quick Pitch Competition (2021 – 2023)
- **Reviewer:** Reviewed two applications for the Anonymous Campus Review for Drexel applicants to the NSF’s Graduate Research Fellowship Program (GRFP) (2021)

SciBridge, NC State University

- **Student chapter co-founder, vice-president, and team leader:** Delivered experimental kits of thermoelectric generators, which included materials needed to complete the experiments, to six universities in Uganda. (2016 – 2020)

Fluid Interface Reactions, Structures and Transport (FIRST) Energy Frontier Research Center (EFRC), Department of Energy (DOE)

- **A-Team leader:** organized the 2019 FIRST EFRC A-Team On-site Meeting in Raleigh and regular online research discussion meetings among the graduate students and postdocs in the center (2018 – 2019)
- **Representative** at DOE Basic Energy Science - Early Career Network: co-organized “Elevator Pitch and Science Speed Dating Lunch” at the 2019 EFRC PI Meeting and “2019 Sept Reps Meeting on Careers” (2019)

Peer reviewer for 20+ journals: *Materials Today*, *Advanced Materials*, *Advanced Energy Materials*, *Advanced Functional Materials*, *Nature Communications*, *ACS Nano*, *ACS Energy Letters*, *Journal of Physical Chemistry Letters*, *Small*, *Small Methods*, *Small Structures*, *Chemical Engineering Journal*, *Advanced Materials Interfaces*, *Journal of Materials Chemistry*

A, Batteries & Supercaps, Electrochemistry Communications, Energy Storage Materials, Journal of the American Ceramic Society, Materials Advances, Journal of Physical Chemistry C, Applied Physics A, ACS Applied Nano Materials, ACS Applied Engineering Materials, Materials Chemistry and Physics.

PROFESSIONAL AFFILIATIONS

International Society of Electrochemistry, the Electrochemical Society, Materials Research Society, American Chemical Society

REFERENCES

Yury Gogotsi, Ph.D.

Director, A.J. Drexel Nanomaterials
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Distinguished University and Charles
T. And Ruth M. Bach Professor
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Engineering
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Veronica Augustyn, Ph.D.

Jake & Jennifer Hooks Distinguished
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