

# Ruocun (John) Wang

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## EDUCATION

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| <b>North Carolina State University, Raleigh, NC, U.S.</b>  | 07/2020     |
| Ph.D. in Materials Science & Engineering<br>Advisor: Prof. Veronica Augustyn<br>Dissertation title: “ <i>Improvement of Electrochemical Ion Insertion Kinetics in Tungsten Oxides with Structural Water and Trace Water in a Non-Aqueous Electrolyte</i> ” |             |
| <b>Purdue University, West Lafayette, IN, U.S.</b>   | 05/2015     |
| B.S. with distinction in Materials Science & Engineering<br>Minor in Global Engineering Studies  |             |
| <b>Study Abroad, Imperial College London, London, UK</b>   | Spring 2014 |

## PROFESSIONAL EXPERIENCE

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

## PEER-REVIEWED PUBLICATIONS

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1. D. Zhang, **R. Wang**, X. Wang, Y. Gogotsi, “*In situ* monitoring redox processes in energy storage using UV-Vis spectroscopy” *submitted*.
2. M. Han, D. Zhang, C.E. Shuck, B. McBride, T. Zhang, **R. Wang**, K. Shevchuk, Y. Gogotsi, “Electrochemically Modulated Interaction of MXenes with Microwaves” *submitted*.
3. M. Anayee, C. Shuck, M. Shekhirev, A. Goad, **R. Wang**, Y. Gogotsi, “Kinetics of  $Ti_3AlC_2$  etching for  $Ti_3C_2T_x$  MXene Synthesis” *submitted*.
4. 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” *submitted*.
5. 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.
6. 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.
7. W.Y. Tsai, **R. Wang**, S. Boyd, V. Augustyn, N. Balke, “Probing local electrochemistry via mechanical cyclic voltammetry curves.” *Nano Energy*, **81** (2021) 105592.
8. **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  $H_2W_2O_7$  via Selective Etching of an Aurivillius Phase.” *Advanced Energy Materials*, (2020) 2003335.
9. 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.
10. **R. Wang**, S. Boyd, P.V. Bonnesen, V. Augustyn, “Effect of Water in a Non-Aqueous Electrolyte on

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Electrochemical Mg<sup>2+</sup> Insertion into WO<sub>3</sub>.” *Journal of Power Sources*, **477** (2020) 229015. (*Special Issue in Celebration of 2019 Nobel Prize in Chemistry*).

11. 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.
12. 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.
13. **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.
14. **R. Wang**, C.C. Chung, Y. Liu, J.L. Jones, V. Augustyn, “Electrochemical Intercalation of Mg<sup>2+</sup> into Anhydrous and Hydrated Crystalline Tungsten Oxides.” *Langmuir*, **33** (2017) 9314–9323.
15. 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.
16. 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.

## AWARDS & HONORS

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| <b>Participant</b> , 2021 Telluride School on Interfacial Chemistry and Charge Transfer for Energy Storage and Conversion                  | 2021 |
| (postponed due to COVID-19 pandemic) <b>Participant</b> , SSMCDAT2020 Hackathon, Institute for Data, Intelligent, Systems, and Computation | 2020 |
| <b>Student Poster 1<sup>st</sup> Prize</b> , 2019 Carolina Science Symposium   | 2019 |
| <b>Overall Grand Prize</b> , 2019 Triangle Student Research Competition  | 2019 |
| <b>ECS Battery Division Student Slam 3 Best Paper Award</b> , 235 <sup>th</sup> ECS Meeting  | 2019 |
| <b>ECS Data Science Hack Week Travel Support</b> , the Army Research Office  | 2019 |
| <b>The Bob and Suester Sowell Travel Fellowship</b> , NC State Grad School   | 2019 |
| <b>2<sup>nd</sup> place at 2019 Graduate Student Research Symposium in Engineering</b> , NC State Grad School                              | 2019 |
| <b>American Society of Microscopy Travel Award</b> , American Society of Microscopy  | 2017 |
| <b>Participant</b> , 2017 Next Generation Electrochemistry Research Institute, University of Illinois at Chicago                           | 2017 |
| <b>2<sup>nd</sup> Place at MRS 2016 Spring Meeting “Sustainability in My Community” Competition</b> , Materials Research Society           | 2016 |
| <b>NCSU CoE Professional Development Travel Award</b> , NCSU College of Engineering  | 2016 |
| <b>John L. Bray Memorial Award</b> , Purdue School of Materials Engineering  | 2015 |
| <b>Matthew Slone Academic Excellence Scholarship</b> , Purdue School of Materials Engineering  | 2014 |
| <b>Industrial Roundtable Scholarship</b> , Purdue Engineering Student Council  | 2014 |
| <b>2014 Expo Scholarship</b> , Purdue Engineering Student Council  | 2014 |
| <b>GEARE Living Allowance</b> , Purdue Office of Professional Practice   | 2013 |
| <b>Study Abroad Scholarship</b> , Purdue Study Abroad Office   | 2013 |
| <b>MSE General Scholarship</b> , Purdue School of Materials Engineering  | 2013 |
| <b>ASM Muncie Chapter Scholarship</b> , American Society for Metals Muncie Chapter   | 2013 |
| <b>Alcoa Foundation Scholarship</b> , Purdue School of Materials Engineering   | 2012 |
| <b>One Brick Higher Award</b> , Purdue University  | 2012 |

## ORAL PRESENTATIONS

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

## SELECTED POSTER PRESENTATIONS

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1. **2<sup>nd</sup> International MXene Conference**, Philadelphia, PA, August 2022.
2. **2019 Carolina Science Symposium**, Raleigh, NC, November 2019.
3. **2019 Triangle Student Research Competition**, Raleigh, NC, October 2019.
4. **O-HyLi Symposium**, Chicago, IL, September 2019.
5. **2019 FIRST EFRC A-Team On-site Meeting**, Raleigh, NC, July 2019.
6. **2019 Graduate Student Research Symposium**, Raleigh, NC, March 2019.
7. **2018 Batteries Gordon Research Conference**, Ventura, CA, March 2018.
8. **232<sup>nd</sup> ECS Meeting**, National Harbor, MD, October 2017.
9. **WE-Heraeus-Seminar: *In-operando* characterization of energy materials**, Bad Honnef, Germany, August 2017.
10. **2017 Joint Nanoscience and Neutron Scattering User Meeting**, Oak Ridge, TN, August 2017.
11. **Center for Dielectrics and Piezoelectrics Spring 2016 meeting**, Kyoto, Japan, June 2016.
12. **MRS Spring 2016 Meeting “Sustainability in My Community” competition**, Phoenix, AZ, March 2016.

## TEACHING & MENTORING

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

- MATE 582 Materials for Energy Storage (graduate): Guest Lecturer (Fall 2022)
- ENGR 220 Fundamentals of Materials (undergraduate): Teaching Assistant (Summer 2022)
- MATE 280 Advanced Materials Laboratory (undergraduate): Lab Class Lecturer (Fall 2021) & Lab Coordinator (Fall 2022)
- MXene Course (world-wide): Taught lectures on Raman of MAX and MXenes: Lecturer (2021 – 2022)
- Mentored the electrochemical aspects
  - Ph.D.: Kateryna Shevchuk, Danzhen Zhang, Lingyi Bi, Tetiana Hryhorchuk, and Alex Inman
  - Master: Joshua Gonzalez, Nastya Morozova, and Jaehoon Choi
  - Undergraduate: Marley Downes and Yan Burets

### Echem Channel, YouTube

- Made 18× videos (collectively > 36,000 views as of Sept 2022) on energy storage, electrochemistry, and literature review: Content Creator (09/2020 – present)

### Department of Materials Science & Engineering, NC State University

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

## SERVICE

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### Women Supporting Women in the Sciences

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

### Drexel University

- Judge: graduate oral and poster research presentations at Drexel Emerging Graduate Scholars (DEGS) Conferences (2021 & 2022)
- Reviewer: Reviewed two applications for the Anonymous Campus Review process for Drexel applicants to the NSF's Graduate Research Fellowship Program (GRFP) (2021)

### SciBridge, NC State University

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

### 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: contributed to the organization of "Elevator Pitch and Science Speed Dating Lunch" at the 2019 EFRC PI Meeting and "2019 Sept Reps Meeting on Careers" (2019)

**Peer reviewer for 14 respected peer-reviewed journals:** *Advanced Energy Materials, Advanced Functional Materials, ACS Nano, Journal of Physical Chemistry Letters, Small, Advanced Materials Interfaces, Journal of the American Ceramic Society, Journal of Physical Chemistry, Applied Physics A, Journal of Materials Chemistry A, Batteries & Supercaps, Electrochemistry Communications, Energy Storage Materials, Journal of Applied Nano Materials.*

## PROFESSIONAL AFFILIATIONS

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the Electrochemical Society, Materials Research Society, American Chemical Society