Kathleen Maleski *Curriculum Vitae*

Ph.D. Candidate
A.J. Drexel Nanomaterials Institute
Dept. of Materials Science and Engineering
Drexel University

3141 Chestnut Street
Philadelphia, PA 19104
Email: kam645@drexel.edu
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Education

2014-Present	**Drexel University** (Philadelphia, PA) **M.S. / Ph.D.**, Materials Science and Engineering
2010-2014	**Washington College** (Chestertown, MD) **B.S.,** Physics **Minor**, Chemistry

Relevant Research and Work Experience

June 2015-Present: Doctoral Student, *Drexel University*, Philadelphia, PA
Ph.D. Advisor: Dr. Yury Gogotsi

- Synthesis of 2D transition metal carbides/carbonitrides (MXenes)
- Solution processing, colloidal solutions, and dispersions of nanomaterials
- Fundamental optical properties of MXenes
- Applications in energy storage, electronics, optics, and sensing
- Working with industry partners, SI2 Technologies

Summer 2016 & 2017: Visiting Researcher, *Korea Advanced Institute of Science and Technology (KAIST) and National Nanofabrication Center (NNFC),* Daejeon, Republic of Korea
Principal Investigators: Dr. Chi Won Ahn (Korea) and Dr. Yury Gogotsi (USA)
FIRST NANO^2 Co-Op Center

- Nanofabrication of microsupercapacitors and microelectronic devices with 2D transition metal carbides as active materials
- Techniques used: photolithography, reactive-ion or plasma etching, electron beam lithography

June 2014-September 2014: Engineering Intern, *Town of Mount Airy (MD)*, Local Government
Mentor: Barney Quinn, P.E. (Town Engineer)

- Assisted the Town Engineer with writing the Storm Water Pollution Prevention Plan (SWPPP) for Maryland Dept. of the Environment and application of Non-tidal and Wetland and Waterway Permit (3.19) for *Town of Mount Airy (MD) Rails to Trails (R2T) Project.* R2T Project was installed June 2015.
- Worked closely with Public Works and Capital projects

May 2013-August 2013: Research for Undergraduates (REU Student), *Penn State University, Center for Nanoscale Science and Materials Research Science and Engineering Center (MRSEC),* State College, PA
Funded by the National Science Foundation
Principal Investigator: Dr. Vincent Crespi

- Conducted theoretical and computational research focused on 2D graphene
- Modeled graphene sheets of various sizes and compared vacancy defects versus sp^3 hybridization defects with DFT (Density Functional Theory) and classical potentials, AIREBO, and ReaxFF.
- Used molecular dynamic simulators LAMMPS and VMD.

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Skills and Expertise

Synthesis of Nanomaterials: 2D materials (MXene), Carbon Materials (Onion - like Carbon)

Processing of Nanomaterials:

- Solution Processing of Nanomaterials (aqueous or organic solutions)
- Particle Size Sorting, Selection, and Isolation (differential and density gradient centrifugation)
- Particle Modification (attrition milling and surface functionalization by acid-oxidation)
- Thin Film Deposition (spray coating, spin coating, printing, adhesion)
- Fabrication Techniques (photolithography, reactive-ion or plasma etching, electron beam lithography, lift-off, nanopatterning)

Characterization of Materials and Devices:

- Analytical Testing: Dynamic Light Scattering, Zeta Potential, Titrations
- Optical: Ultraviolet-visible-Near Infrared Spectroscopy (UV-vis-NIR), Fourier Transform Infrared Spectroscopy (FTIR)
- Device Assembly and Test: Supercapacitor Assembly, Cyclic Voltammetry, Galvanostatic Charge and Discharge, Electrochemical Impendence Spectroscopy, Conductivity Testing, Kiethley 4200
- Microscopy: Scanning Electron Microscopy (SEM – Zeiss Supra VP50), Energy Dispersive X-Ray Spectroscopy (EDS/EDX), Optical Microscopy

Selected Awards and Honors (during Graduate Studies)

2017 International Travel Award, Office of International Programs, Drexel University
2017 Outstanding Alumni Award, Gamma Sigma Epsilon, Washington College
2017 SMART Fellowship Semi-Finalist, Department of Defense
2017 Three Minute Thesis (3MT) Finalist, Graduate College of Drexel University
2016 Best Poster Nomination, Materials Research Society, Fall 2016 Meeting, Boston, MA
2016 365-24-7 Presentation Competition Winner, Drexel University
2015 Drexel University Dean's Fellowship, Drexel University
2015 Higher Education Advocacy Travel Award (HEATA), Drexel University
2014 Drexel University College of Engineering Fellowship, Drexel University

Select Professional Service and Membership (during Graduate Studies)

2015-17 Lab Safety Liaison (BioRAFT Online Safety Training) for Drexel Nanomaterials Labs
2017 Alpha Sigma Mu, Materials Science and Engineering
2017 Honorary Membership, Gamma Sigma Epsilon, Washington College
2016-17 Student Global Advisory Board - Nominated Graduate Student Position
2016-17 NanoArtography Team – international scientific microscopy competition
2016-17 Student Chapter Board Member, Materials Research Society (MRS)
2015-16 Chemical Inventory for Drexel Nanomaterials Labs
2015-17 Treasurer, Electrochemical Society (ECS) Philadelphia Chapter
2015-17 Vice President (2016-17), Treasurer (2015-16) Materials Engineering Graduate Student Network

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Teaching Experience

2017 **Teaching Assistant**, ENG 220: Fundamentals of Materials, Drexel University (~400 students)
- Held office hours every week, proctored exams, grading of 4 recitation sections

2015-17 **Mentor of Undergraduate/High School Students**, Drexel University
- 2015 (6 months) mentored sophomore co-op undergraduate (milling and particle size
- 2016 (3 months) mentored sophomore co-op undergraduate (electrochemistry)
- 2016 (1 day) mentored high school student, MRS Fall 2016 Meeting, Boston, MA
- 2017 (present) mentor of undergraduate researcher (separation and thin film deposition)
- 2017 (present) mentor of undergraduate researcher (electrochemistry)

2016 **Teaching Assistant**, International Summer School, KAIST – NNFC, Daejeon, Republic of Korea
- Presented a lecture- and lab-style tutorial on the synthesis of 2D MXene

2015 **Teaching Assistant**, MATE 280: Advanced Materials Laboratory, Drexel University (~35 students)
- Gave two lectures: "Particle Size Analysis" and "Data Analysis and Presentation"
- Planned and ran weekly labs on select characterization techniques

Publications and Presentations

Peer-reviewed Publications

1. Cheng, X.-B., Zhao, M.-Q., Chen, C., Pentecost, A., **Maleski, K.,** Mathis, T., Zhang, Z.-Q., Zhang, Q., Jiang, J., Gogotsi, Y., "Nanodiamonds Suppress the Growth of Lithium Dendrites", (2017) *Nature Communications* (accepted).
2. Yan, J., Ren, C.E., **Maleski, K.**, Hatter, C.B., Anasori, B., Urbankowski, P., Sarycheva, A., Gogotsi, Y., "Flexible MXene/Graphene Films for Ultrafast Supercapacitors with Outstanding Volumetric Capacitance", (2017) *Advanced Functional Materials* 1701264.
3. **Maleski, K.**, Mochalin, V. N., Gogotsi, Y., "Dispersions of Two-Dimensional Titanium Carbide MXene in Organic Solvents", (2017) *Chemistry of Materials* 29 (4), 1632-1640.
4. Van Aken, K.L., **Maleski, K.**, Mathis, T.S., Breslin, J.P., Gogotsi, Y., "Processing of onion-like carbon for electrochemical capacitors", (2017) *ECS Journal of Solid-State Science and Technology* 6 (6), M3103-M3108.
5. Xie, X., Zhao, M. Q., Anasori, B., **Maleski, K.**, Ren, C. E., Li, J., Byles, B. W., Pomerantseva, E., Wang, G., Gogotsi, Y., "Porous Heterostructured MXene/Carbon Nanotube Composite Paper with High Volumetric Capacity for Sodium-Based Energy Storage Devices", (2016) *Nano Energy.*
6. **Maleski, K.**, Zhao, M. Q., Gogotsi, Y., "Nanomaterials in Electrical Energy Storage Applications", (2016) *HDIAC Journal* 3 (3), 6-12. (**HDIAC** – Homeland Defense and Security Information Analysis Center, a United States Department of Defense (DoD) Journal) + Journal Cover

Articles Submitted or Under Review

1. Sarycheva, A., Makaryan, T., **Maleski, K.**, Satheeshkumar, E., Melikyan, A., Minassian, H., Yoshimura, M., Gogotsi, Y. (2017) *Journal of the American Chemical Society*, under review
2. Alhabeb, M., **Maleski, K.**, Anasori, B., Lelyukh, P., Clark, L., Sin, S., Gogotsi, Y. (2017) *Chemistry of Materials,* under review

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Conference Proceedings

1. **Maleski, K.**, Van Aken, K. L., Mathis, T. S., Breslin, J., Gogotsi, Y., *Effects of Processing Conditions on the Capacitive Performance of Onion-like Carbon* (Carbon 2016, Penn State University, 2016).
2. Handy, E., **Maleski, K.**, Mathis, T. S., Van Aken, K. L., Gogotsi, Y., Dibenedetto, G., Zunino, J., *Flexible, Printed Ultracapacitors for Use in Extreme Environments*, (47th Power Sources, 2016).

Select Research Presentations

1. **Maleski, K.,** Makaryan, T., Kim, Y.-J., Kim, J.-W., Lee, B.-J., Oh, J.-S., Ahn, C.-W., Gogotsi, Y., "Nanofabrication of Microelectronic Devices with Two-Dimensional MXene", *NANOKorea 2017*, Goyang, South Korea, Summer 2017. Oral Presentation.
2. **Maleski, K.**, Won, C.-W., Gogotsi, Y., "Global Science and Technology: Nanofabrication of Two-Dimensional Carbides for Microelectronic Devices", *International Research Showcase*, Drexel University, Spring 2017. Poster Presentation.
3. **Maleski, K.**, Mochalin, V., Gogotsi, Y., "Two-dimensional Titanium Carbide ($Ti_3C_2T_x$) MXene in Organic Solvents", *ASM Liberty Bell Chapter*, Philadelphia, PA, USA, 2017. Poster Presentation.
4. **Maleski, K.**, Mochalin, V., Gogotsi, Y., "Two-dimensional Titanium Carbide ($Ti_3C_2T_x$) MXene in Organic Solvents", *MRS Fall Meeting*, Boston, MA, USA, 2016, Poster presentation. Best Poster Nominee
5. **Maleski, K.**, Gogotsi, Y. "Two-dimensional Materials as Supercapacitor Electrodes". *KAIST-Drexel MRS Joint Symposium*, KAIST, Deajeon, South Korea. 2016, Oral Presentation.
6. **Maleski, K.**, Mochalin, V., Gogotsi, Y, "Dispersion of Titanium Carbide MXene in Organic Solvents". *NANOKorea 2016*, Goyang, South Korea. Summer 2016. Poster Presentation.
7. **Maleski, K**., Xu, E., Crespi, V., "How to place a tetrahedron into a plane: sp^3 defects in sp^2 carbon". *Research for Undergraduates Symposium*. Pennsylvania State University. University Park, State College, PA. 2013. Poster Presentation and Oral Presentation.

Select Outreach Presentations

1. **Maleski, K.,** "Interaction of Light and Electricity with the 2D World", *Three-Minute Thesis (3MT) Competition*, *Drexel Graduate Emerging Scholars Conference*. The Graduate College of Drexel University, Philadelphia, PA. Spring 2017. Oral Presentation.
2. **Maleski, K**., "Think Big: Think Nano", Invited Speaker, *Gamma Sigma Epsilon Induction Ceremony*, Gamma Eta Chapter, Department of Chemistry, Washington College, Chestertown, MD. Spring 2017. Oral Presentation.
3. **Maleski, K**., "One Story: Graduate School, Research Interests, and Beyond". *Preparing Chemistry Majors for the 21st Century*, Department of Chemistry, Washington College, Chestertown, MD. Spring 2016. Oral Presentation.
4. **Maleski, K**., "Propelling students into life after graduation". *Higher Education Advocacy Travel Award (HEATA) Sponsored Talk*. Department of Physics, Washington College, Chestertown, MD. Fall 2015. Oral Presentation.