

Kathleen Maleski

**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  
Phone: 443-340-4881

**Education**

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- 2015-Present**                      **Drexel University** (Philadelphia, PA)  
**Ph.D.**, Materials Science and Engineering
- 2010-2014**                        **Washington College** (Chestertown, MD)  
**B.S.**, Physics  
Minor, Chemistry

**Research and Work Experience**

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**June 2015-Present:** Doctoral Student, *Drexel University*, Philadelphia, PA  
Principal Investigator: Dr. Yury Gogotsi

- Ultracapacitor Project with SI2 Technologies: *Printed, Flexible Ultracapacitors Based on Novel, High-Performance Carbon Nanomaterials*
- Microscale device technology and synthesis of carbon nanomaterials
- Synthesis of transition metal carbides/carbonitrides
- Investigations of colloidal solutions and dispersions
- Optical properties of solutions and optoelectronic devices
- Applications in energy storage, electrochemistry

**July 2016-September 2016:** Visiting Researcher, *Korea Advanced Institute of Science and Technology (KAIST) and National Nanofabrication Center (NNFC)*, Daejeon, South Korea  
Principal Investigators: Dr. Chi Won Ahn (Korea) and Dr. Yury Gogotsi (USA)

- Nanofabrication (photolithography, plasma etching, electron beam lithography) of micro-supercapacitors using novel 2D transition metal carbides

**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 variety of tasks including writing the Storm Water Pollution Prevention Plan (SWPPP) for Maryland Dept. of the Environment
- Application of Non-tidal and Wetland and Waterway Permit (3.19) for *Town of Mount Airy (MD) Rails to Trails Project*
- 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**

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**Synthesis of 2D materials (MXene)**

**Synthesis of Carbon Materials (Onion - like Carbon)**

**Characterization:**

- Electrochemical Testing: VMP3 Potentiostat: Cyclic Voltammetry, Galvanostatic Charge and Discharge, Electrochemical Impedance Spectroscopy, EC-lab
- Particle Size Analysis: Malvern Zetasizer – Particle Size Distribution and Zeta Potential Measurements
- Glove Box, Dry Environments, Supercapacitor Assembly
- UV-vis spectroscopy (UV-vis), Near-IR Spectroscopy (NIR)
- Fourier Transform Infrared Spectroscopy (FTIR)
- Scanning Electron Microscopy (SEM – Zeiss Supra VP50)
- Energy Dispersive X-Ray Spectroscopy (EDS/EDX)
- Modeling/computational software: LAMMPS (Large-scale Atomic/Molecular Massively Parallel Simulator); VMD (Visual Molecular Dynamics), AIREBO and ReaxFF potential; Avogadro chemical modeling;
- CrystalDiffract, CrystalMaker

**Coding:** Beginner's Linux and Beginner's C++; HTML/CSS

**Graphing Software:** Maple; LoggerPro; OriginPro 8.5

**Design:** Adobe Products (Photoshop, Illustrator, InDesign), Website Design

**Languages:** English (fluent), Spanish (intermediate), Korean (beginner)

**Honors and Awards**

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- 2016 **Best Poster Nomination**, Materials Research Society, Boston
- 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
- 2014 **Washington College Leadership MVP**, Washington College (**Repeat Winner from 2013**)
- 2014 **All-Centennial Academic Honor Roll**, NCAA Centennial Conference **Received 6 times total: Lacrosse (2014, 2013 and 2012) and Soccer (2013, 2012, and 2011)**
- 2014 **All-Centennial Second Team (Lacrosse)**, NCAA Centennial Conference
- 2013 **All-Centennial Sportsmanship Team**, NCAA Centennial Conference **Received twice: Soccer (2013) and Lacrosse (2011)**
- 2011 **Cater Society of Junior Fellows Appointment**, Cater Society, MD
- 2010 **Washington College Presidential Fellowship**, Washington College
- 2010 **Maryland Distinguished Scholar**, Maryland Higher Education Commission
- 2010 **Governor's State Merit Scholars Award**, State of Maryland (**top 5% of graduating class**)
- 2010-2014 **Dean's List**, Washington College

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**Leadership and Outreach Experience**

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- 2017 **Philly Materials Day Demo Leader**
- 2017 **Lab Safety Liaison** (BioRAFT Online Safety Training) for Drexel Nanomaterials Labs
- 2016 **Student Global Advisory Board - Nominated Graduate Student Position**
  - Appointed to assist with Office of International Studies Programs such as International Co-Op, Study Abroad, and Drexel Global Initiatives
- 2016 **NanoArtography Team**
  - International scientific image competition hosted by A. J. Drexel Nanomaterials Institute
  - Web Design and competition organization, as well as competition ad designs
- 2016 **Materials Research Society (MRS) Student Chapter Board Member**
  - Organized and Chaired *1<sup>st</sup> KAIST-Drexel MRS Joint Symposium* at KAIST (~15 min presentations, 8 student speakers between KAIST and Drexel University)
- 2016 **Chemical Inventory, Safety Monitoring** for Drexel Nanomaterials Labs
- 2015 **Electrochemical Society (ECS) Treasurer**
  - Organized 1<sup>st</sup> Philadelphia ECS Symposium
- 2015 **Materials Engineering Graduate Student Network** (Treasurer, 2015) (Vice President, 2016)
  - Organized social events for materials engineering graduate students including “Pizza after Seminar” and Trips to the Franklin Institute, kept the financial records for the organization
- 2013-2014 **Women’s Varsity Soccer and Women’s Varsity Lacrosse Captain**, Washington College
- 2011-2014 **Curriculum Committee Natural Science Student Representative**, Washington College

**Teaching Experience**

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- 2016 **Invited Speaker and Mentor**, Chemistry Department, Washington College
  - Gave seminar to junior chemistry majors titled, “One Story: Graduate School, Research Interests, and Beyond” preparing chemistry majors for the 21<sup>st</sup> century
- 2016 **Teaching Assistant**, International Summer School, Korea Advanced Institute of Science and Technology, National Nanofab Center
  - Presented a PowerPoint tutorial on the synthesis of two-dimensional materials, especially 2D MXene, followed by a lab tutorial of synthesis techniques
- 2015-2016 **Mentor of Co-Op Students**
  - 2015 (6 months) mentored sophomore undergraduate (milling and particle size studies)
  - 2016 (3 months) mentored sophomore undergraduate (electrochemistry studies)
- 2015 **Teaching Assistant**, MATE 280: Advanced Materials Laboratory, Drexel University
  - Organized guest speakers, weekly labs, and administrative class business
  - Held office hours every week (2 hours and by appointment)
  - Organized and ran labs for students on SEM/EDS, Particle size Analysis, XPS, Raman, BET/Gas Absorption
  - Gave two lectures: “Particle Size Analysis” and “Data Analysis and Presentation”
- 2015 **Invited Speaker and Mentor**, HEATA Sponsored Talk and Discussion, Physics Department, Washington College, Chestertown, MD
- 2011-2014 **Tutor** (Chemistry, Calculus, Physics), Washington College

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**Publications and Presentations**

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*Peer-reviewed Publications*

1. **Maleski, K.;** Mochalin, V. N.; Gogotsi, Y.; Dispersions of Two-Dimensional Titanium Carbide MXene in Organic Solvents, (2017) *Chemistry of Materials* (accepted)
2. 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
3. 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*
4. **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)

*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, (47<sup>th</sup> *Power Sources*, 2016).

*Presentations*

1. **Maleski, K.** Mochalin, V.; Gogotsi, Y, *Two-dimensional Titanium Carbide (Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub>) MXene in Organic Solvents*, Materials Research Society, Boston, MA, USA, 2016, Poster presentation. **Best Poster Nominee**
2. **Maleski, K.** Gogotsi, Y. *Two-dimensional Materials as Supercapacitor Electrodes*. KAIST-Drexel MRS Joint Symposium, Deajeon, South Korea. 2016, Oral Presentation.
3. **Maleski, K.** Mochalin, V., Gogotsi, Y, *Dispersion of Titanium Carbide MXene in Organic Solvents*. NANOKorea 2016, Goyang, South Korea. 2016. Poster presentation.
4. **Maleski, K.** *One Story: Graduate School, Research Interests, and Beyond*. Preparing Chemistry Majors for the 21<sup>st</sup> Century, Washington College, Chestertown, MD. 2016. Oral Presentation.
5. Xu, E.; Lueking, A.; Crespi, V.; Lammert, P.; **Maleski, K.** In *Role of sp<sup>3</sup> Defect in Ordered Nanoporous Carbon*, APS Meeting Abstracts, 2016.
6. Xu, E., **Maleski, K.** Angela Lueking, Vincent Crespi, George Froudakis. *New Carbon Nanostructural Motifs and an Expansion of Euler's Rules for mixed sp<sup>2</sup>/sp<sup>3</sup> Carbon*. DOE-BES Synthesis/Processing PI Meeting. Gaithersburg, MD. 2013. Poster Presentation.
7. **Maleski, K.** Xu, E., Crespi, V., *How to place a tetrahedron into a plane: sp<sup>3</sup> defects in sp<sup>2</sup> carbon*. Research for Undergraduates Symposium. Pennsylvania State University. University Park, State College, PA. 2013. Poster Presentation and Oral Presentation.