

KEON L. VEREEN  
Seattle, WA 98105  
Email: kvereen@uw.edu

---

## PROFESSIONAL INTERESTS

Interests in experimental plasma physics, plasma diagnostics (probe and optical), plasma for environmental remediation, advanced in-space propulsion, and plasma thruster development. Experience using machine shops (manual & CNC machines), 3D printing, and vacuum systems.

## EDUCATION

University of Washington (UW), Seattle, WA

Ph.D., Aeronautics and Astronautics 2019

- **PH.D. THESIS:** Investigation of a Cluster of High-Power Helicon Thrusters for Advanced In-Space Electric Propulsion Applications.
- Advisor: Dr. Robert Winglee, Professor, Dept. of Earth & Space Sciences

University of Central Florida (UCF), Orlando, FL

M.S., Thermofluid Aerodynamics Systems Design and Engineering 2011

- **M.S. THESIS:** An Experimental Investigation on the Dynamics of Bubbles Utilizing Refrigerant R134a under Pressurized Flow Boiling Conditions.
- Advisor: Dr. Ranganathan Kumar, Professor, Dept. of Mechanical and Aerospace Engineering

B.S., Aerospace Engineering 2010

## RESEARCH EXPERIENCE

**UW Advanced Propulsion Laboratory** Seattle, WA  
Graduate Student Researcher 2015 - 2019

- Involved in dissertation research: pulsed plasma thrusters and helicon thrusters
- Assembly of vacuum systems and power supply units
- Advisor: Dr. Robert Winglee, Professor, Dept. of Earth & Space Sciences

**UW Setthivoine You Research Laboratory** Seattle, WA  
Graduate Student Researcher 2011 - 2015

- Involved in dissertation research: astrophysical jets and plasma propulsion
- Assembly of vacuum systems and power supply units
- Set up and performed preliminary work on ion Doppler spectroscopy
- Set up an analytical plasma plume code for environmental remediation

**UCF Ranganathan Kumar Research Laboratory** Orlando, FL  
Graduate Student Researcher 2010 – 2011

- Involved in master's thesis research: two-phase flow & heat transfer studies
- Set up and performed flow boiling heat transfer experiments toward naval reactor applications

- Partnership between UCF and Knolls Atomic Power Laboratory (KAPL)

**Summer Mentoring Graduate Program, UCF** 2010

- Directed research on heat flux and pressure dependent experiments in flow boiling of refrigerant R-134a. Advisor: Dr. Ranganathan Kumar

**Ronald E. McNair Post-Baccalaureate Achievement Program, UCF** 2008 - 2010

- Participated in a summer course and workshop series on research, fellowships, and professional socialization.

**Research and Mentoring Program (RAMP), UCF** 2008 - 2010

- Developed and conducted research on nucleate boiling in a high pressure refrigerant flow with a fluid mechanics heat transfer professor. Advisor: Dr. Ranganathan Kumar

**NSF Research Experience for Undergraduates (REU), UCF** 2008

- Investigated the principles of bubble dynamics in a flow boiling system using thermochromic liquid crystals. Advisor: Dr. Ranganathan Kumar

**NSF EXCEL Program, UCF**

Undergraduate Research Student 2008

- Examined and assembled different lab instrumentations with the guidance of a lab technician funded through Undergraduate Research Experiences (URE).

Editor 2007

- Edited Science, Technology, Engineering, and Mathematics (STEM) research presentations for applications of calculus courses intended to help EXCEL students.

## PUBLICATIONS

### Technical Publications:

- **K. Vereen**, et al. "Characterization of the Dielectric Barrier Discharge Thruster for Microsatellite Applications." AIAA Propulsion and Energy 2019 Forum. 2019
- **K. Vereen**, et al. "Recent Advances in the Clustering of High Power Helicon Thrusters." AIAA Propulsion and Energy 2019 Forum. 2019
- **K. Vereen**, et al. "An Active Debris Removal Mission using a Plasma Phased Array Architecture." 2018 AIAA SPACE and Astronautics Forum and Exposition. 2018
- **K. Vereen**, et al. "Characterization of a Cluster of High Power Helicon Thrusters." 53rd AIAA/SAE/ASEE Joint Propulsion Conference. 2017.
- S.M.S. Murshed, **K. Vereen** and R. Kumar, "An experimental investigation of bubble nucleation of a refrigerant in pressurized boiling flows," ENERGY, September 2010.
- S.M.S. Murshed, **K. Vereen** and R. Kumar, "Flow Boiling Experiments Of R-134A Refrigerant In a Pressurized System," ASME 2009 International Mechanical Engineering Congress & Exposition IMECE 2009, Lake Buena Vista, FL, November 13-19, 2009.

- S.M.S. Murshed, **K. Vereen** and R. Kumar, “Bubble Nucleation of R134A Refrigerant in a Pressurized Flow Boiling System,” 7th ECI International Conference on Boiling Heat Transfer, Florianopolis-SC, Brazil, May 3-7, 2009.

### **Engineering Education Publications:**

- B. Fabien, and **K. Vereen**. "Implementing a freshman engineering design experience at the University of Washington." Proceedings of the 3rd International Conference on Higher Education Advances. Editorial Universitat Politècnica de València, 2017.

### **SCHOLARLY PRESENTATIONS**

- “A Plasma Tweezers Concept to De-spin an Asteroid,” APS DPP, New Orleans, LA <http://meeting.aps.org/Meeting/DPP14/Session/NP8.80>, October 29, 2014
- “Vector Tomographic Reconstruction of 3D Plasma Flows with Ion Doppler Spectroscopy,” APS DPP, Denver, CO <http://meetings.aps.org/link/BAPS.2013.DPP.BP8.5>, November 11, 2013
- “Heat Flux and Pressure Dependent Experiments in Flow Boiling of R-134a,” SACNAS National Conference (Science, Technology & Diversity for a Sustainable Future), Anaheim, CA, October 1, 2010
- “Wind Turbine: Train Tunnel Application,” 2<sup>nd</sup> Annual Progress Energy Senior Design Symposium in Renewable & Sustainable Energy, University of Central Florida, Orlando, FL, April 14, 2010
- “Experiments for Heat Flux and Pressure Dependent Flow Boiling of R-134a,” Showcase of Undergraduate Research Excellence, University of Central Florida, Orlando, FL, April 1, 2010
- “Optical Measurements in Nucleate Boiling for High Pressure Refrigerant Flow Part 2,” McNair Conference, Penn State University, State College, PA, July 18, 2009
- “Optical Measurements in Nucleate Boiling for High Pressure Refrigerant Flow Part 1,” Showcase of Undergraduate Research Excellence, University of Central Florida, Orlando, FL, April 2, 2009
- “Thermochromic Liquid Crystals for Bubble Nucleation in Flow Boiling Under Pressurized Suva,” S2INT3 NSF REU Symposium, University of Central Florida, Orlando, FL, August 7, 2008

### **TEACHING EXPERIENCE**

**UW College of Engineering**

Seattle, WA

STARS Program Senior Teaching Assistant

2017 - 2019

- Managed workshop logistics and canvas development for 20 students per course per quarter

- Developed workshop materials, i.e. practice modules, test-taking drills, and mock exams in the areas of physics: mechanics and physics: electromagnetism to assist pre-engineering STARS students in their coursework
- Aligned workshop materials with course syllabus; PHYS 121 Mechanics and PHYS 122 Electromagnetism
- Assisted with introductory mathematics: calculus and introductory chemistry principles throughout academic quarters, i.e., test-taking drills & fundamentals mastery sessions

ENGR 197 Workshop Instructor

2017

- Managed course logistics and website development for 25 students
- Developed workshop materials, i.e. practice modules, test-taking drills, and mock exams in the areas of statics and dynamics to assist pre-engineering students in their coursework
- Aligned workshop materials with course syllabus; AA 210 Statics and ME 230 Dynamics

ENGR 197 Workshop Instructor

2016

- Managed course logistics and website development for 25 students
- Developed workshop materials, i.e. practice modules, test-taking drills, and mock exams in the areas of physics and statics to assist pre-engineering students in their coursework
- Aligned workshop materials with course syllabus; PHYS 121 Mechanics and AA 210 Statics

AA 462 Rocket Propulsion Teaching Assistant

2016

- Managed course logistics and website development for 45 students
- Responsible for providing additional support and assistance to student regarding lectures, homework, and exams
- Graded all course homework and exams
- Facilitated student discussions and practice review sessions in preparation for exams
- Supervisor: Dr. Mitsuru Kurosaka

ENGR 202 Instructor

2016

- Re-designed and implemented an “ENGR 202 - Introduction to Engineering Design” course for the College of Engineering for a 100 student population.
- Taught pre-engineering students how to work effectively in teams to design, build, and test projects to solve challenges centered on energy, environment, health, infrastructure, and exploration.
- Developed lab workshops and managed an instruction team, i.e. three teaching assistants.
- Coordinated with lab technician overseeing small machine shop.
- Core components of course were technical content & communication, teamwork, and professionalism.
- Collaborated with Associate Dean of Academic Affairs, Dr. Brian Fabien

ENGR 202 Instructor

2015

- Designed and implemented an “ENGR 202 - Introduction to Engineering Design” course for the College of Engineering during a Women in Science and Engineering (WiSE) summer bridge program.
- Taught lectures & labs to accommodate 20 incoming pre-engineering students how to work effectively in teams to design, build, and test projects.
- Computer-aided design, programming using Python, and additive manufacturing were introduced for students to construct prototypes & perform analyses.

## HONORS & AWARDS

- George Dragseth Endowed Fellowship, UW Dept. Aeronautics & Astronautics 2015
- NSF Graduate Research Fellowship 2011 - 2015
- University of Washington GO-MAP McNair Fellowship 2012 - 2013
- UW Engineering Learning Communities Scholarship 2013
- Ford Foundation Predoctoral Fellowship, Honorable Mention 2011
- UCF Graduate RAMP Master's Fellowship 2010 - 2011
- UCF Summer Mentoring Fellowship 2010
- 2010 NSF Graduate Research Fellowship, Honorable Mention 2010
- 2010 Sigma Gamma Tau Undergraduate Award, Honorable Mention 2010
- 2010 Showcase of Undergraduate Research Excellence (SURE), Honorable Mention 2010
- Ronald E. McNair Post-Baccalaureate Achievement Program 2008 - 2010
- NSF REU Program Certification of Completion, UCF 2008
- Florida Academic Scholars Award 2006 - 2010

## LEADERSHIP & SERVICE

Since being at the University of Washington, I've served with a variety of leadership boards to assist with outreach, recruitment, and retention of underrepresented students in undergraduate and graduate programs. I'm also a mentor and discussion facilitator for the programs listed below.

### Leadership

- UW GO-MAP Graduate Student Advisory Board 2011 - 2017
- UW CAMP Advisory Board 2015 - 2016
- UW SACNAS Chapter, Vice President 2013 - 2014
- UW SACNAS Chapter, Social Media Coordinator 2012 - 2013

### Service

- Washington Space Grant Consortium 2012 - 2019
- GO-MAP, Graduate Opportunities and Minority Achievement Program 2012 - 2017
- UW CAMP, College Assistance Migrant Program 2012 - 2016
- Washington MESA, Mathematics, Engineering, Science Achievement 2012 - 2014
- UW College of Engineering, Engineering Academic Center 2012 - 2014
- LSAMP, Louis Stokes Alliance for Minority Participation 2012 - 2014

## TECHNICAL TRAINING

- Microsoft Word, Excel, and PowerPoint, MATLAB, Python, LabVIEW, Autodesk Inventor, Solidworks, Fluent, and Satellite Tool Kit (STK)

## AFFILIATIONS

- **APS**, American Physical Society
- **AIAA**, American Institute of Aeronautics and Astronautics

- **Sigma Gamma Tau**, Aerospace Honor Society
- **Tau Beta Pi**, the Engineering Honor Society
- **SACNAS**, Society for Advancement of Chicanos and Native Americans in Science
- **ERPS**, Electric Rocket Propulsion Society