

# Juliusz Aleksander Kruszelnicki

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## **EDUCATION**

### **PhD in Nuclear Engineering and Scientific Computing, University of Michigan**

- Graduate Research Assistant, Computational Plasma Science and Engineering
- **GPA:** 3.90/4.00

**Current**  
**Ann Arbor, MI**

### **Bachelor of Science in Nuclear Engineering, University of Florida**

- Honors Program Graduate
- Cum Laude Honors
- **GPA:** 3.50/4.00

**08.2010 – 05.2015**  
**Gainesville, FL**

## **REASERCH EXPERIENCE**

### **University of Michigan, Ann Arbor, MI**

*Academic Advisor: Professor Mark Kushner*

**Current**  
*Graduate Research Assistant*

- Performed computational research of atmospheric pressure plasma interactions in plasma-chemical catalytic systems

### **University of Florida, Gainesville, FL**

*Principle Investigator: Professor James Tulenko*

**08.2014 – 08.2015**  
*Undergraduate Research Assistant*

- Aided in development of innovative, accident tolerant, high thermal conductivity UO<sub>2</sub> fuel
- Used Spark Plasma Sintering machine to fabricate 4.95% UO<sub>2</sub>-Diamond composite fuel pellets (17x17 and 15x15) for irradiation in the Advanced Test reactor
- Carried out pellet analysis via x-ray diffraction, Raman spectroscopy, and scanning electron microscopy
- Executed CASMO 4E and Simulate3K simulation runs and analysis of mixed component fuels' reactor performance
- Lead the initiative to quantify the thermal effects of several dopants on UO<sub>2</sub>
- Developed thermally/neutronically coupled modeling technique for doped, annular fission fuel

### **Tri Alpha Energy, Irvine, CA**

*Supervisor: Erik Trask, PhD*

**Summer of 2013**  
*Corporate Internship Research Assistant*

- Modified implicit geometries and structures of the GENRAY.f plasma ray tracing code to allow open magnetic flux surface ray trajectories for Reverse Field Confinement device
- Found means of maximizing intra-separatrix power deposition via Electron Bernstein Wave coupling mechanisms
- Compiled and analyzed data pertaining to ray propagation in the electron cyclotron range of frequencies
- Designed, constructed and tested RFC DT reactor high vacuum chamber systems

### **Oculus Research, Gainesville, FL**

*Supervisor: Dan Dickrell, PhD*

**08.2012 – 04.2013**  
*Research Assistant*

- Wrote MATLAB routines designed for retinal vascular structure analysis, as means of early illness detection and diagnosis
- Ported and scaled existing MATLAB codes to platform independent language (C++)

### **University of Florida, Gainesville, FL**

*Principle Investigator: Professor Yong Yang*

**08.2012 – 04.2013**  
*Undergraduate Research Assistant*

- Assisted in design, construction, and implementation of a fluid-based pressurized piping system intended for simulated PWR-environment ZrC cladding corrosion investigation
- Performed microstructure analysis of 2 MeV proton irradiated, ultra-high purity ZrC, using transmission electron microscopy

### **Los Alamos National Laboratory, Los Alamos, NM**

*Advisor: Bruce Letellier, PhD*

**Summer of 2012**  
*Summer Research Assistant*

- Researched and derived methods for risk analysis of South Texas Nuclear Plant's spray/sump filtration systems via micro and macro structure deposit and hydraulic interaction analysis
- Structured MATLAB hydraulic sequences for the plant's limiting conditions of the sump and spray system, the filtration system flow, and the spray system cooling capacities

### **Los Alamos National Laboratory, Los Alamos, NM**

*Advisor: Bruce Letellier, PhD*

**Summer of 2011**  
*Summer Research Assistant*

- Researched means of kinematic characterization of explosives-propelled shrapnel via employment of self-developed computer-based synthetic radiography and analysis of experimental X-Ray imaging
- Created analytical means of 3-D object identification, elemental density assessment, and trajectory and kinetic energy calculation

## **LEADERSHIP**

### **Treasurer,** *IEEE Southeastern Michigan Nuclear Plasma Physics Section*

**Current**

- Handled daily operations of IEEE section, including budgeting, event organization, and general body meetings

### **Session Chair,** *University of Michigan Engineering Research Symposium*

**2015**

- Recruited session judges, from amongst University faculty, alumni, and corporate affiliates
- Organized and presided over the Nuclear Sciences and Engineering presentation session

### **University Scholar,** *University of Florida University Scholar Program*

**2012-2015**

- Selected as an independent undergraduate research fund recipient for 2013 and 2014
- Leads research and construction of an innovative, pulsed DD fusion reactor which utilizes a hybrid Inertial Electrostatic/Magnetic, pulsed confinement system of own design
- Optimized Focus Electrode Concept geometrics and energetics via a Schwartz-Christoffel ionic pathway and electromagnetic field analysis
- Designed, simulated, constructed and tested high voltage/high current pulsed power systems

### **President & Founder,** *Motorcycle Association of Students and Staff*

**2011 - 2015**

- Organized nation's largest collegiate motorcycle riding group
- Lead riding skill development workshops, organized group events (up to 50 participants), set up a local network of vendor sponsors

## **HONORS**

- 2016 Fellow, Michigan Institute of Plasma Science and Engineering
- 2016 ANS Landis Scholarship
- 2015 ANS Student Conference: Best Undergraduate Paper Award
- 2015 University of Florida Nuclear Engineering Student of the Year
- 2015 National Science Foundation Graduate Fellowship Honorable Mention
- 2015 University of Florida Honors Program Graduate
- 2015 University of Florida: Pagano Scholarship
- 2015 University of Florida: Jacobs Scholarship
- 2014 University of Florida: University Scholar Award
- 2014 ANS Landis Scholarship
- 2014 University of Florida: Pagano Scholarship
- 2014 World Association of Science Engineering and Technology Conference: Best Student Presentation
- 2014 ANS Fusion Energy Division: Outstanding Student Paper Award
- 2013 University of Florida: University Scholar Award
- 2013 University of Florida: Pagano Scholarship
- 2011 Los Alamos National Laboratory Student Symposium Best in Engineering Presentation Award

## **PRESENTATIONS**

- 'Confined Atmospheric Plasma Sources for Activating Gases, Liquids and Tissue', **2<sup>nd</sup> Author**, 2016 Hakone XV, Brno, Czech Republic;
- 'Properties of Atmospheric Pressure Plasmas in Packed Bed Reactors', **1<sup>st</sup> Author**, 2016 International Conference On Plasma Science, Banff, Canada
- 'Discharge Morphology as a Function of Dielectric Constant in a 2-Dimensional Packed Bed Array', **2<sup>nd</sup> Author**, 2016 International Conference On Plasma Science, Banff, Canada
- 'Properties Influencing Plasma Discharges in Packed Bed Reactors', **1<sup>st</sup> Author**, 2016 Dept. of Energy Plasma Science Center Annual Meeting, University of Maryland, College Park, MD
- 'Property Analysis and Advanced Manufacturing Technique Development for Light Water Reactor Annular Composite Fuel', **1<sup>st</sup> Author**, 2015 American Nuclear Society Student Conference, College Station, TX;
- 'Impact of Focusing Grid Electrodes and Pulsed Power on Modified IEC Fusion Device', **1<sup>st</sup> Author**, 2014 American Nuclear Society Conference, Anaheim, CA;
- 'Inertial Electrostatic/Magnetic Confinement Hybrid Fusion Device', **1<sup>st</sup> Author**, 2014 World Association of Science Engineering and Technology Conference, Stockholm, Sweden;
- 'Ray Tracing of Electron Bernstein Waves in 2D for C-2 Equilibrium', **2<sup>nd</sup> Author**, 2013 American Physics Society Conference, Denver, CO;
- 'Kinematic Characterization of High-Velocity, Explosives-Propelled Objects via X-Ray Image Analysis', **1<sup>st</sup> Author**, 2011 Los Alamos National Laboratory Student Symposium, Los Alamos, NM;

## **CODING PROFICIENCY**

- Mathematica, MCNP (X.5.6), MicroShield, MatLab, Simulink, C++, Fortran, HTML, SIMULATE3, CASMO4e, SCALE, ABAQUS, AutoCAD, EES,