Sasha Petrenko

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EDUCATION

Missouri University of Science and Technology Rolla, MO
Ph.D. in Aerospace Engineering GPA: **3.8** – December 2021
B.S. in Aerospace Engineering, Minor in Mathematics, Summa Cum Laude GPA: **3.82** – December 2016

Research Interests

- Machine Learning, Optimal Estimation, Astrodynamics

Honors and Awards

- Missouri University of Science and Technology Chancellor's Distinguished Fellowship

Applicable Courses

- Methods in Orbit Determination, Advanced Astrodynamics, Neural Networks, Clustering, Real Analysis, Harmonic Analysis, Markov Decision Processes, Adaptive Dynamic Programming, Intermediate Dynamics, Stability and Control, Applied Computational Methods, Probability and Statistics, Aerospace Mechanics

SKILLS

Languages:
English – Fluent
Russian – Fluent
French – Moderate

Programming:
MATLAB/Simulink – Expert
Python (stdlib, numpy, tf/keras) – Expert
C/C++ – Moderate
LaTeX – Expert

PUBLICATIONS AND PRESENTATIONS

- Yamilov, A., **Petrenko, S.**, Sarma, R., & Cao, H. (2016). Shape dependence of transmission, reflection, and absorption eigenvalue densities in disordered waveguides with dissipation. Physical Review B, 93(10).
- **Petrenko, S.**, (2017) *Survey of Modern Machine Learning Techniques and Applications,* Oral, Missouri S&T AREUS Laboratory, Rolla, MO
- **Petrenko, S.**, (2016) *Closing Presentation on Custom FPGA-Deployable Data-Flow Controller Algorithm*, Oral, Ball Aerospace and Sandia Laboratories, Albuquerque, NM

EXPERIENCE

Missouri S&T Applied Computational Intelligence Lab Missouri S&T, Rolla, MO
Research Assistant 2019 – Current

- Create technology demo of multi-target tracking and identification capabilities, combining GMPHD multi-target state estimation with machine-learning methods for friend-or-foe identification
- Present grant solicitation of technology demo to high-ranking military personnel

Missouri S&T AREUS Lab Missouri S&T, Rolla, MO
Research Assistant 2016 – 2019

- Researched applications of estimation and machine learning algorithms as applied to navigation
- Studied automatic maneuver detection in orbital tracking algorithms
- Developed sandbox for Monte Carlo simulation of dynamic combinations of estimation algorithms
- Conducted presentations to staff demonstrating results of applications of machine learning and estimation
- Created hardware demonstration of multi-sensor multi-target tracking of dynamic objects
- Represented Aerospace Engineering department in graduate outreach

Ball Aerospace – Albuquerque Albuquerque, NM
Engineering Aide 2016

- Supported Sandia National Laboratories clients in future work projects
- Tested HDL IP cores performance and characteristics on FPGA development boards (Zynq)
- Designed and developed MATLAB/Simulink data-flow controller algorithm for HDL compilation via System Generator
- Wrote specialized CRC software for HDL compilation

Sandia National Laboratories Albuquerque, NM
Technical Engineering Intern 2016

- Developed and tested Simulink software for model-based design and deployment of algorithms via VHDL onto FPGA's for satellite applications
- Developed Simulink model for FPGA application of GPS receiver command, control, and log functionality
- Wrote, tested, and integrated sensor data acquisition and parsing algorithms for atmospheric embedded application

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Missouri S&T Satellite Research Team Missouri S&T, Rolla MO
Guidance, Navigation, and Control / Command and Data Handling / Stereoscopic Imaging 2015 – Current

- A research team that works with AFRL/NASA to design, construct, and launch small satellites
- Generating and implementing command and data handling software interface between flight computer and peripherals
- Implementing and testing guidance, navigation, and control flight software using Raspberry Pi – MATLAB – Simulink interface utilizing model-based design
- Writing stereoscopic imaging algorithm and software for camera image capture and control

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Missouri S&T Physics Undergraduate Research Missouri S&T, Rolla MO
Undergraduate Research 2015 – 2016

- Collaborating one-on-one with physics professor to explore wave propagation in random ordered media
- Utilizing Python, Python libraries, and GPU-accelerated functions to create quantum transport models for iterative simulation
- Published in peer-reviewed journal

Parker Hannifin – Sporlan Division Washington, MO
Electronics Engineering Co-op 2014 – 2015

- Successfully lead a high-profile project through design, testing, and launch
- Collaborated with multi-disciplinary division teams and external vendors
- Developed test plans and lab test requests, collaborating with technicians
- Developed 3D models and rapid printed prototypes for numerous projects
- Developed and implemented an advanced mathematical temperature profile model
- Tested and evaluated new iOS application

Missouri S&T Formula Electric Team Missouri S&T, Rolla MO
Composites Team Leader 2013 – 2014

- Lead design of aerodynamic surfaces of the vehicle and performed extensive CFD analysis
- Fabricated of carbon-fiber and fiberglass shroud to implement aerodynamic design
- Prepared and delivered proposal presentations to prospective sponsors such as university alumni
- Represented the Missouri S&T Formula electric team at alumni, sponsor, and recruitment events
- Designed chassis and internal framework parts of an Electric-Class Formula SAE style vehicle

Materials Science and Engineering Research Internship Auburn University, Auburn AL
Research Intern 2011 – 2012

- Conducted solid-oxide fuel cell, solid-oxide thermoelectric, and magnetostrictive solutions research
- Prepared samples using: ceramics processing, ball milling, sintering, and sputtering
- Performed sample measurement and analysis using certifications in scanning electron microscopy, transmission electron microscopy, and x-ray diffraction
- Prepared and delivered presentations and activities for prospective department students