

Mark B. Moffett

mbedfordm@gmail.com | 1.419.350.3082 |

EDUCATION

BSc. Mechanical Engineering

UNIVERSITY OF TOLEDO

Toledo, OH | May 2013

MSc. Mechanical Engineering

FLORIDA INSTITUTE OF TECHNOLOGY

Melbourne, FL | May 2017

Teacher Assistant (TA): Control Systems, Robotics Summer Camp 2015

PhD. Mechanical Engineering

FLORIDA INSTITUTE OF TECHNOLOGY

Melbourne, FL | Dec 2021

Teacher Assistant (TA): Physics 1, Physics 2, Calculus 1, Aerospace Structures, Mechanics of Materials, Introduction to Aerospace

WORK EXPERIENCE

AEROVIRONMENT, INC | SYSTEMS ENGINEER III

Melbourne, FL | Oct 2022 – present

- Chief Engineer on \$6MM army RCCTO dismounted common controller program
- Manage systems level processes for development of software and hardware requirements for unmanned aerial vehicle command and control. Achieved STANAG 4703 airworthiness compliance for a core program.
- Co-author on 10+ unmanned aerial vehicle patents

SPACEWAVE, LLC | CHIEF OF RELIABILITY, SAFETY, AND QUALITY CONTROL

Satellite Beach, FL | May 2020 – present

- Designed and developed pulsed high power control systems using customized microcontrollers, LabVIEW programs, C++ and C languages integrated into a cohesive data acquisition and control system
- Designed, manufactured, and calibrated custom sensors for characterizing current, temperature, density, and magnetic fields in plasma environments
- Designed, developed, and deployed a novel high voltage power supply for a high energy plasma discharge system in a low pressure environment
- Designed and deployed novel modular solid state switch arrays for high energy pulsed power systems

PROJECTS

MAGNETOSPHERE PARTICLE DEFLECTOR (DISSERTATION) LARGE MAGNETIC FIELDS, ELECTRON GUN, HIGH VOLTAGE, HIGH CURRENT, CONTROL SYSTEMS, DATA ACQUISITION

Designed and built an original particle accelerator and deflector as a prototype for in space radiation shielding. An accompanied particle accelerator was built to test the efficacy of the field reversed configuration design. Final experimental results show the particles deflecting via pulsed high current magnetic field. Results published in Advances in Space Research journal. Funding provided by NASA Florida Space Grant Consortium and SpaceWave, LLC.

COAXIAL PLASMA GUN HIGH VOLTAGE, HIGH CURRENT, CONTROL SYSTEMS, DATA ACQUISITION

Designed and built an original coaxial plasma gun with variable power control, current feedback, and magnetic field diagnostics. A basis for fundamental electric propulsion research. Plasma propagation and formation confirmation completed with 70,000 FPS high speed camera diagnostics. Results published in IEEE Transactions on Plasma Science. Funding provided by SpaceWave, LLC

AUTONOMOUS AIRCRAFT AND GROUND VEHICLE PIXHAWK, ARDUPILOT, MISSION PLANNER, GAZEBO, MAVLINK, ROS, OPENCV, RADIO DATA TRANSMISSION

Designed and built a quadcopter and ground vehicle with 3D printed mounts for electronics. Installed flight controllers with GPS to develop autonomous missions and swarm capabilities. Simulated missions developed and performed in Gazebo. Funding provided by the Florida Tech Aerospace, Physics, and Space Sciences Department.

SKILLS - EXPERT

Hardware & software control systems using C, C++, Python, and LabVIEW

Solid state switching, current and magnetic field sensor design, calibration, and deployment

Mechatronics

SolidWorks, Finite Element Analysis, and 3D Printing

AWARDS & SCHOLARSHIPS

NASA Florida Space Grant Consortium Funding for Fall 2017 & Summer 2020

Aerospace & Space Systems Pillar Grant Awarded Spring 2018

Graduate Student of the Year 2017, Florida Institute of Technology

NSF/ASME Design Essay Competition Winner 2017, 2018

CONFERENCES

"Precision timing controlled pulsed power current distribution solid state switch array for use in plasma and magnetic field generation"

M.B. Moffett, D.L. Chesny, K.W. Hatfield

APS Division of Plasma Physics, October 30 - November 3, **2023**, Denver, CO

"Bdot probe and Rogowski coil cross calibration and sensor fusion in pulsed direct current capacitor discharges"

M.B. Moffett, D.L. Chesny, K.W. Hatfield, J. Cole, R. Rusovici

APS Division of Plasma Physics, October 17-21, **2022**, Spokane, WA

PUBLICATIONS

"Operation and Qualification of Coaxial Plasma Gun Modes with a Gas Puff Inlet"

IEEE Transactions on Plasma Science, **2022**

D.L. Chesny, **M.B. Moffett**, K.W. Hatfield, J. Cole, K. Landers, Y. Shokrollahi, F. Ege

<https://ieeexplore.ieee.org/document/9791452>

"Development and Experimental Verification of a Strong Field Fan-spine Magnetic Null Point Topology"

IEEE Transactions on Plasma Science, **2022**

D.L. Chesny, **M.B. Moffett**, J.M. Cole, U. Baptiste, N.B. Orange

<https://ieeexplore.ieee.org/document/9777884>

"Electron particle deflection using a field reversed configuration magnetosphere geometry as an analog for radiation shielding in deep space" *Advances in Space Research*, **2022**

M.B. Moffett, D.L. Chesny, J.M. Cole, R. Rusovici

DOI: <https://doi.org/10.1016/j.asr.2022.02.028>

"Bdot probe and Rogowski coil cross calibration and sensor fusion in pulsed DC capacitor discharges."

AIP Review of Scientific Instruments **2022**

M.B. Moffett, D.L. Chesny, J.M. Cole, K.W. Hatfield, R. Rusovici

DOI: <https://doi.org/10.1063/5.0076741>

"Biomass allocation in response to accession recognition in *Arabidopsis thaliana* depends on nutrient availability and plant age" *Plant Signaling & Behavior*, **2022**

T.S. Bento, **M.B. Moffett**, D.C. Centeno A.P.D.Scrocco, A. Fox, A. Palmer

DOI: [10.1080/15592324.2021.2004025](https://doi.org/10.1080/15592324.2021.2004025)

"Parametric Scaling of A Magnetic Field-Reversed Conducting Coil Assembly for Radiation Shielding."

Advances in Space Research, **2021**

D.L. Chesny, **M.B. Moffett**, A. Yanga, N.B. Orange, R. Rusovici

DOI: <https://doi.org/10.1016/j.asr.2021.07.038>

"An Algorithm for Generating 3D Lattice Structures Suitable for Printing on a MultiPlane FDM Printing Platform."

I.B. Ishak, **M.B. Moffett**, P. Larochelle ASME IDETC/CIE 2018 August 26-29, 2018, Quebec City, Quebec, Canada

DOI: [10.1115/DETC2018-85459](https://doi.org/10.1115/DETC2018-85459)

"Design of a 3D Printable Mechanical Time Simulating Solar System for use in STEM Education."

M.B. Moffett, P. Larochelle. ASME IDETC/CIE 2017 August 6-9, 2017, Cleveland, OH, USA

DOI: <https://doi.org/10.1115/DETC2017-68144>

"Motivating STEM Studies Through a Space Exploration Robotics Summer Camp."

S. Du, T. Ebert, I. B. Ishak, L. J. i, X. Mao, **M.B. Moffett**, J. Sundram, P. Larochelle.

ASME IDETC/CIE 2016 August 21-24, 2016, Charlotte, NC, USA

DOI: [10.1115/DETC2016-59606](https://doi.org/10.1115/DETC2016-59606)