

GREG FURLICH

Remote Sensing Research Scientist

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8 years expertise in remote sensing research with a specialization in:

- image classification, segmentation, and generation with machine learning
- radiometric event reconstruction and analysis
- data fusion for object detection, tracking, and state estimation
- signal processing
- algorithm development

EDUCATION

Doctorate of Philosophy, *Physics*

2014 - 2020

Master of Science, *Physics*

2014 - 2018

University of Utah, Salt Lake City, UT

Bachelor of Science, *Physics*

2010 - 2014

Michigan Technological University, Houghton, MI

Magna Cum Laude

Minors: Mathematical Sciences and German

SKILLS

Programming Languages: [Python \(Keras, TensorFlow, Numpy, Scipy, Pandas, Pyroot\)](#) [MATLAB](#) [C](#) [C++](#) [CERN ROOT](#)

Development Environments: [Jupyter Notebooks](#) [Linux VMs \(AWS EC2\)](#) [HPCs \(Slurm and PBS schedulers\)](#) [GPU](#) [Kubeflow](#)

Remote Sensing Data Sources: [GOES](#) [Landsat](#) [Sentinel](#) [SRTM](#)

Markup Languages: [HTML](#) [CSS](#) [\$\text{\LaTeX}\$](#) [Markdown](#) Foreign Languages: [German](#)

Miscellaneous: Strong analytic and problem solving experience, exceptional verbal and written communication skills, and collaborative finesse.

RESEARCH EXPERIENCE

Research Scientist Sr.

Jan 2021 - Present

**Lockheed Martin Space Systems,
APEX (Advanced Programs and Exploitations)**

- Signal processing, algorithm development, data fusion, object detection, object tracking, and object state estimation
- Synthetic radiometric scene generation
- Super resolution, image-to-image translation, and style transfer with Generative Adversarial Networks (GANs), image segmentation with UNETs and FCNs, object classification with Convolution Neural Networks (CNNs).
- Selected as a Recognized Technical Talent for technical contributions within first year.
- Generated intellectual property which was awarded and protected as a trade secret.

Graduate Research Assistant in Cosmic Rays

2014 - 2020

**Telescope Array (TA) Cosmic Ray Observatory, Institute of High Energy Astrophysics,
Department of Physics and Astronomy, University of Utah**

Research Advisor: Douglas Bergman

Thesis : Observation of the GZK Suppression with the Telescope Array Fluorescence Telescopes and Deployment of the Telescope Array Expansion

- Analyzed 10 years of UV fluorescence event data to calculate a cosmic ray energy spectrum.
- Classified weather over TA using false color videos of the detectors' field of view in a Recurrent Convolution Neural Network (RCNN) model.

RESEARCH EXPERIENCE CONTINUED

Research Assistant in Cosmic Rays

2013 - 2014

Department of Physics, Michigan Technological University

Research Advisor: Brian Fick

Senior Research Project: Preliminary Search for Exotic Events in the Auger Cosmic Ray Observatory Surface Detector Data

Research Assistant in Nanofabrication

2011 - 2012

Department of Physics, Michigan Technological University

Research Advisor: Yoke Khin Yap

SELECTED PUBLICATIONS AND PROCEEDINGS

Sub-Pixel Localization of Objects Using Multiple Spectral Bands, M. Gupta, J. Chan, M. Krouss, [G. Furlich](#), P. Martens, M. Chan, M. L. Comer, E. J. Delp, IEEE Aerospace Conference, 2022, *accepted*

Recent measurement of the Telescope Array energy spectrum and observation of the shoulder feature in the Northern Hemisphere, D. Ivanov, D. Bergman, [G. Furlich](#), R. Gonzalez, G. Thomson and Y. Tsunesada, Proceedings of Science 395 (ICRC2021), 341, 37th International Cosmic Ray Conference, Berlin, Germany, July 2021

Telescope Array 10-Year Monocular Spectrum, Douglas Bergman, [Greg Furlich](#), Proceedings of Science 395 (ICRC2021), 339, 37th International Cosmic Ray Conference, Berlin, Germany, July 2021

Observation of the GZK Suppression with the Telescope Array Fluorescence Telescopes and Deployment of the Telescope Array Expansion, [Greg Furlich](#), Thesis, University of Utah, April 2020

Telescope Array FD Weather Classification using Machine Learning, [Greg Furlich](#), Proceedings of Science (ICRC2019), 261, 36th International Cosmic Ray Conference, Madison, WI, July 2019

Towards a Telescope Array 10 Year FD Monocular Energy Spectrum, [Greg Furlich](#), Douglas Bergman, Proceedings of Science (ICRC 2019), 260, 36th International Cosmic Ray Conference, Madison, WI, July 2019

AWARDS

Recognized Technical Talent, Lockheed Martin

Selected 2021

Departmental Scholar, Department of Physics, Michigan Technological University

2013

Sigma Pi Sigma, Physics Honor Society

Inducted 2013

Michigan Space Grant Consortium Recipient

2012

LEADERSHIP, MENTORING, AND OUTREACH

Research Mentor, Lockheed Martin

Sub-pixel localization and multispectral signal processing, Purdue University PhD Candidate

2021 - Present

Machine learning cloud segmentation in satellite imagery, United States Military Academy West Point Cadet

2021 - Present

Academic Senate, University of Utah

Member, Graduate Assembly Ad Hoc Committee

2019

College of Science, University of Utah

Member, College of Science Council

2017 - 2018

Member, College of Science Curriculum Committee

2017 - 2018

Member, College of Science College Student Council

2017 - 2018

Department of Physics and Astronomy, University of Utah

Chair, Graduate Student Advisory Council

2017 - 2018

Member, Graduate Student Advisory Council

2015 - 2019

Science Outreach

Volunteer, Physics Open House, Weber State University

2017, 2018, 2019

Volunteer, Science Day, University of Utah

2017, 2019

Volunteer and Speaker, Great Basin Astronomy Festival, Great Basin NP

2018