GREG FURLICH

Remote Sensing Research Scientist

g.furlich@gmail.com 952.836.7589 Boulder, CO
gregfurlich.com linkedin.com/in/greg-furlich github.com/gfurlich

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

- **image classification, segmentation, and generation with machine learning**
- **radiometric event reconstruction and analysis**
- **object detection and tracking**
- **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 | 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, object detection and tracking
- 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