

**Thomas Colligan**  
**Assistant Research Scientist - University of Maryland Earth System Science Interdisciplinary  
Center/ NASA Goddard Space Flight Center Biospheric Sciences Lab**  
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## OVERVIEW & BACKGROUND

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Thomas Colligan is a scientific software developer with extensive expertise in machine learning, high-performance computing, cloud computing, and software design. Currently, he focuses on operationalizing the LPJ-EOSIM Dynamic Global Vegetation Model. His research and software development aims to deepen our understanding of the biospheric carbon cycle, particularly in wetland methane and biospheric carbon anomaly detection and attribution. Thomas also enhances the availability, latency, and fidelity of biospheric carbon estimates by streaming near-real-time LPJ-EOSIM products to the U.S. Greenhouse Gas Center and the Land Processes Distributed Active Archive Center (LPDAAC) using modern data engineering techniques. Previously, he worked as a staff researcher at the University of Arizona, where he conducted basic research in machine learning and bioinformatics, published multiple software libraries, and mentored students.

### Skills/tools:

- Python, C/C++, Slurm, bash, R, Matlab, C/C++, Docker, Airflow, git, PyTorch, tensorflow, huggingface
- Workflow orchestration, ETL pipelines, AWS
- Google Earth Engine, rasterio, QGIS, GDAL
- Transformers, contrastive learning, model emulation, semantic segmentation

## EDUCATION & EXPERIENCE

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### UMD CMNS-ESSIC / NASA GSFC

*Assistant Research Scientist*

**College Park, MD**

*Jul 2023 - Present*

### University of Arizona

*Research Scientist*

**Tucson, Arizona**

*Oct 2022 - Feb 2023*

### University of Montana

*Research Scientist*

**Missoula, MT**

*Jan 2021 - Oct 2022*

### University of Montana

*MS, Computer Science*

**Missoula, MT**

*Sep 2018 - Dec 2020*

### University of Montana

*BA, Physics, magna cum laude, minor Computer Science*

**Missoula, MT**

*Sep 2013 - Aug 2018*

## PUBLICATIONS

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- 2024 Daniel R. Olson, Daphne Demekas, **Thomas Colligan**, Travis J. Wheeler. (2024) NEAR: Neural Embeddings for Amino Acid Relationships. *bioRxiv*, <https://doi.org/10.1101/2024.01.25.577287>
- 2023 **Thomas Colligan**, Kayla Irish, Douglas J. Emlen, Travis J. Wheeler. (2023) DISCO: A deep learning ensemble for uncertainty-aware segmentation of acoustic signals. *PLOS ONE*, <https://doi.org/10.1371/journal.pone.0288172>
- 2022 Vishwesh Venkatraman, **Thomas Colligan**, George T Lesica, Daniel R Olson, Jeremiah Gaiser,

- Conner J Copeland, Travis J Wheeler, Amitava Roy. (2022) Drugsniffer: an open source workflow for virtually screening billions of molecules for binding affinity to protein targets. *Frontiers in Pharmacology*, <https://doi.org/10.3389/fphar.2022.874746>
- 2022 **Thomas Colligan**, David Ketchum, Douglas Brinkerhoff, Marco Maneta. (2022) A deep learning approach to mapping irrigation using Landsat: IrrMapper U-Net. *IEEE Transactions on Geoscience and Remote Sensing*, <https://doi.org/10.1109/TGRS.2022.3175635>
- 2020 **Thomas Colligan**, Jennifer Fowler, Jaxen Godfrey, Carl Spangrude. (2020) Detection of stratospheric gravity waves induced by the total solar eclipse of July 2, 2019. *Nature Scientific Reports*, <https://doi.org/10.1038/s41598-020-75098-2>