

Fermi Summer School 2024

The [Fermi Summer School](#) emphasizes the analysis of data from the Fermi instruments through lectures and hands-on workshops. Students spend time working directly with experts in instrumentation, analysis, theory and modeling to develop and extend their own research projects. Topics cover much of the gamma-ray band ranging from keV-MeV transients seen with Fermi's GBM to the highest energies observed by the LAT and the very high energies observed by ground-based gamma-ray telescopes. This year's school will be held at the [University of Delaware Conference Center](#) in [Lewes, Delaware](#), from May 28 to June 7, 2024.

Material will be aimed at graduate students and post-doctoral researchers. Topics will include particle acceleration and gamma-ray production mechanisms; space-based and ground-based gamma-ray instrumentation; spectral, spatial, and time-based analysis of gamma-ray data; modeling and interpretation of gamma-ray data; and astrophysical source classes such as AGN, GRBs, Galactic pulsars and binary systems, supernova remnants, and pulsar wind nebulae as well as searches for dark matter and new physics.

The software necessary for the tutorials (such as the [Fermitools](#)) are distributed in the [FermiBottle Docker Container](#), a fully-functional, self-contained analysis environment. Please go through the [Summer School Checklist](#) to make sure the container is functioning correctly.

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Schedule

Go directly to [Week 1](#) or [Week 2](#). All times are in Eastern Daylight Time (UTC04:00).

See our [Code of Conduct](#) and [COVID-19 guidelines](#).

Week 1

	Tues, May 28	Wed, May 29	Thurs, May 30	Fri, May 31	Sat, June 1
8:00	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
9:00	Welcome and Introductions - Liz	Damiano - Lecture 1	Damiano - Lecture 2	Damiano - Lecture 3	PWN - Jordan
10:00	Intro to Fermi	Intro to Fermi LAT	Impostor Syndrome workshop - All	Cecilia - Lecture 2	Stats Lecture 5 - Cole
11:00	Break	Break	Break	Break (Photo!)	Break
11:30	Stats Lecture 1 - Cole	Cecilia - Lecture 1	Intro to Fermi GBM	Student Talks / 1 Slide Summaries	Student Talks / 1 Slide Summaries
12:30	Lunch	Lunch	Lunch	Lunch	Lunch
1:30	Getting started with Fermi: Tools and Resources - Joe Eggen, Joe Asercion, Alex Reustle, Sheimy, Paz, Nestor Mirabal (remote), Don Horner (remote) Data Exploration notebook Data Quicklook notebook	Stats Lecture 2 - Cole Getting Started with Likelihood Analysis - Liz, Joe fermi-summer-school Github repository - See README file for instructions to download files for the analysis Likelihood Notebook Look here for a few project Ideas	Stats Lecture 3 - Cole Next Steps with Likelihood - Liz	Stats Lecture 4 - Cole Extended sources	Spectra and lightcurves

4:45	End of the Day Tag-up	End of the Day Tag-up	End of the Day Tag-up	End of the Day Tag-up	End of the Day Tag-up
	Bike rental pick-up - leave by 4:30				

Week 2

	Mon, June 3	Tues, June 4	Wed, June 5	Thurs, June 6	Fri, June 7
8:00	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
9:00	Lecture 1 - Qi	Polarization - Haocheng	Lecture 2 - Qi	Magnetars - Oliver	9:00 - 9:30 Pack up. 9:30 - 10:30 Closing Session Feedback Form
10:00	Transients - Oliver	Student Talks / 1 Slide Summaries	Student Talks / 1 Slide Summaries		
11:00	Break	Break	Break	Break	Break
11:30	GRB GW - Niccolò	Student Talks / 1 Slide Summaries	Rubin LSST - Fed	Student Talks / 1 Slide Summaries	Complete packing up and return bikes.
12:30	Lunch	Lunch	Lunch	Lunch	Lunch
1:30	Burst analysis workshop	Free Afternoon	Time-based analysis topics		
4:45	End of the Day Tag-up		End of the Day Tag-up	End of the Day Tag-up	

Student Talks and 1 Slide Summary Schedule

Friday, May 31

Saturday, June 1

Monday, June 3

Tuesday, June 4

Wednesday, June 5

Thursday, June 6

Group Photos

Supporting Material

- Primary announcements will be sent out via an e-mail list.
- Secondary announcements, interaction between sessions, instructor-student, and student-student communication will be handled via [Slack](#). Instructions on joining the Summer School Slack will be sent to attendees by e-mail.
- This confluence page will be the home for the schedule as well as the presentation and supporting materials.
- There are a number of [video tutorials](#) for Fermi data analysis already available. You can also find tutorials posted on the FSSC's [Data Analysis](#) section.
- Presentation and material for Josh Wood's [presentation](#) on GRB analysis

Interesting repositories for Fermi analysis

- [FermiBottle](#) - a fully-functional, self-contained analysis environment used in the Summer School
- [Summer School Github Repository](#) containing Jupyter notebooks used during the Summer School
- [fermiPy](#) and [documentation](#)

Stay up-to-date with the gamma-ray sky

- [List of the currently available data products at the FSSC](#) - Catalogs and lightcurve products in addition to links to data archives
- [Public List of LAT-Detected Gamma-Ray Pulsars](#) - continuously updated list of confirmed gamma-ray pulsars
 - [2nd LAT Pulsar Catalog](#) - covers the first 3 years of data (includes timing models)
 - [Pulsar ephemerides for published sources](#) - hosted at the FSSC data access website and lists contacts who are timing LAT pulsars in radio
 - [LAT Gamma-ray Pulsar Timing Models](#)
- [Find Fermi publications](#)
- [Fermi-LAT publications page](#)
- [List of rapid communications from the LAT team](#)
- [Table of Fermi GBM gamma-ray bursts](#)
- [Fermi Gamma-ray Coordinates Network \(GCN\) notices](#)

Additional Resources for gamma-ray astronomy and astrostatistics

- From the [Handbook of X-ray and Gamma-ray Astrophysics](#):
 - [Telescope Concepts in Gamma-Ray Astronomy](#)
 - [Compton Telescopes for Gamma-ray Astrophysics](#)
- Source naming schemes and catalogs:
 - [General considerations](#)
 - Most gamma-ray sources are [objects outside the solar system](#)
- [On YAML \(yaml files\)](#)

Things to Do in Lewes

- Take the ferry to [Cape May](#).
- [Hire kayaks](#) (Don't forget sun screen!).
- If the weather's good, go to the beach! Lewes Beach is fine, or there's a beach on the ocean-side in [Cape Henlopen State Park](#). (Don't forget sun screen!)
- Visit [Prime Hook National Wildlife Refuge](#) (Don't forget bug repellent)
- Visit the [Zwaanendael Museum](#)
- Visit the US Lightship [Overfalls](#) (located just off of Pilottown Rd):
- [Biking and hiking trails](#)