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The Adirondack Sky Center & Observatory
In the heart of the Adirondack Mountains, Tupper Lake, NY provides one of the best destinations for stargazing in the East. The combination of low-light pollution, low humidity and high altitude provide nearly ideal conditions for night sky viewing. It is here where the Adirondack Sky Center & Observatory has been laying its roots into the dark side of a hill on Big Wolf Road.
This relatively new and growing facility strives to "provide quality educational experiences for people of all ages through the science, technology, and history of astronomy." Offering a variety of unique public stargazing opportunities, educational lectures, family-friendly events, and more, the Adirondack Sky Center & Observatory is exposing the night sky in a new dimension.

Our Mission
The mission of the Adirondack Sky Center & Observatory is to provide quality educational experiences for people of all ages through the science, technology, and history of astronomy.

We will accomplish our goals through the following actions:

- Enhance public awareness and advance the science of Astronomy.
- Integrate with area schools, colleges, and universities.
- Encourage and support amateur astronomers of all generations young and old.
- Provide families, civic, and community groups the opportunity to view the night sky with various telescopes.
- Add to the enjoyment and quality of life in the Adirondack Mountains.
- Contribute to scientific discovery.
- Collect historic astronomical related items.
- Invite the public to hear lectures and view seminars from experts in the field of Astronomy.

Contact
email: info@adirondackskycenter.org
Phone: (518) 359-3538

Mailing Address:
P.O. Box 1332
Tupper Lake, NY 12986
### Thursday, October 3

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Instructor</th>
<th>Beginner/Intermediate Strand</th>
<th>Intermediate/Advanced Strand</th>
<th>Instructor</th>
<th>Location</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 AM - 12:00 PM</td>
<td>Office</td>
<td>Seth McGowan</td>
<td>Meet/Greet/Introductions/Experience/Equipment</td>
<td>Intermediate Session: Principles of Astrophotography</td>
<td>Andy Metz</td>
<td>Office Classroom A</td>
<td>2:00 PM - 4:00 PM</td>
</tr>
<tr>
<td>12:00 PM - 2:00 PM</td>
<td>On Your Own</td>
<td></td>
<td></td>
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<td></td>
<td>Lunch &amp; Break</td>
</tr>
<tr>
<td>2:00 PM - 4:00 PM</td>
<td>Office Classroom A</td>
<td>Tim Connolly</td>
<td>Instructional Session: Principles of Astrophotography</td>
<td>Instructional Session: Introduction to Widefield Astrophotography</td>
<td>Andy Metz</td>
<td>Office Classroom B</td>
<td>2:00 PM - 4:00 PM</td>
</tr>
<tr>
<td>4:00 PM - 6:00 PM</td>
<td>On Your Own</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Dinner</td>
</tr>
<tr>
<td>6:00 PM - 8:00 PM</td>
<td>Roll Off Roof Observatory or Middle/High School Groups and Facilitators</td>
<td>Tim Connolly</td>
<td>Skill Building - Hands-On: Field Setup: Equipment / Polar Alignment / Troubleshooting</td>
<td>Demonstration: ZWO ASIAir</td>
<td>Andy Metz</td>
<td>Roll Off Roof Observatory</td>
<td>8:00 PM - 8:30 PM</td>
</tr>
<tr>
<td>8:00 PM - 12:00 AM</td>
<td>Roll Off Roof Observatory Groups and Facilitators</td>
<td>Tim Connolly</td>
<td>Skill Building - Hands-On Imaging: Introduction to Deep Space Imaging</td>
<td>Demonstration: On Pole Master</td>
<td>Andy Metz</td>
<td>Roll Off Roof Observatory (Inside)</td>
<td>8:30 PM - 9:00 PM</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Demonstration: PHD Drift Alignment Tool</td>
<td>Seth McGowan</td>
<td>Roll Off Roof Observatory (Inside)</td>
<td>8:00 PM - 12:00 AM</td>
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<tr>
<td></td>
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<td></td>
<td>Special Session: Single Exposure Astrophotography</td>
<td>Gordie Duval</td>
<td>Roll Off Roof Observatory (Inside)</td>
<td>8:00 PM - 12:00 AM</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Skill Building - Hands-On Imaging: Wide-field Imaging</td>
<td>Andy Metz</td>
<td>Roll Off Roof Observatory / Designated Area of Driveway</td>
<td>8:00 PM - 12:00 AM</td>
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<tr>
<td>12:00 AM</td>
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<td></td>
<td>Breakdown for the Night</td>
</tr>
</tbody>
</table>

### Friday, October 4

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Instructor</th>
<th>Beginner/Intermediate Strand</th>
<th>Intermediate/Advanced Strand</th>
<th>Instructor</th>
<th>Location</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 AM - 12:00 PM</td>
<td>Office</td>
<td>Tim Connolly</td>
<td>Special Session: Backyard Solar Imaging &amp; Preparing for the Mercury Transit</td>
<td>Instructional Session: Tracked Long Exposure Astrophotography - Part I</td>
<td>Andy Metz</td>
<td>Office Classroom B</td>
<td>10:00 AM - 12:00 PM</td>
</tr>
<tr>
<td>12:00 PM - 2:00 PM</td>
<td>On Your Own</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lunch &amp; Break</td>
</tr>
<tr>
<td>2:00 PM - 2:50 PM</td>
<td>Office Classroom A</td>
<td>Tim Connolly</td>
<td>Instructional Session: Cameras, Equipment, Settings, &amp; Files</td>
<td>Instructional Session: Tracked Long Exposure Astrophotography - Part II</td>
<td>Andrew Metz</td>
<td>Office Classroom B</td>
<td>2:00 PM - 2:50 PM</td>
</tr>
<tr>
<td>3:00 PM - 4:30 PM</td>
<td>Office Classroom B</td>
<td>Group</td>
<td>Skill Building - Hands-On: Frame Evaluation Before Processing</td>
<td>Skill Building - Hands-On Imaging: Widefield</td>
<td>Tim Connolly</td>
<td>Roll Off Roof Observatory</td>
<td>8:00 PM - 12:00 AM</td>
</tr>
<tr>
<td>4:30 PM - 6:00 PM</td>
<td>On Your Own</td>
<td></td>
<td></td>
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<td></td>
<td>Dinner</td>
</tr>
<tr>
<td>6:00 PM - 7:00 PM</td>
<td>Roll Off Roof Observatory Groups and Facilitators</td>
<td>Tim Connolly</td>
<td>Skill Building - Hands-On Imaging: Widefield</td>
<td>Demonstration: On Pole Master</td>
<td>Andy Metz</td>
<td>Roll Off Roof Observatory</td>
<td>7:00 PM - 7:30 PM</td>
</tr>
<tr>
<td>7:00 PM - 12:00 AM</td>
<td>Roll Off Roof Observatory Groups and Facilitators</td>
<td>Tim Connolly</td>
<td>Skill Building - Hands-On Imaging: Widefield</td>
<td>Demonstration: PHD Drift Alignment Tool</td>
<td>Seth McGowan</td>
<td>Roll Off Roof Observatory (Inside)</td>
<td>7:30 PM - 8:00 PM</td>
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<tr>
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<td></td>
<td>Special Session: Single Exposure Astrophotography</td>
<td>Gordie Duval</td>
<td>Roll Off Roof Observatory (Inside)</td>
<td>8:00 PM - 12:00 AM</td>
</tr>
<tr>
<td>12:00 AM</td>
<td></td>
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<td></td>
<td>Skill Building - Hands-On Imaging: Mars, Neptune, and Uranus (on 14&quot;)</td>
<td>Tim Connolly</td>
<td>Roll Off Roof Observatory</td>
<td>8:00 PM - 12:00 AM</td>
</tr>
</tbody>
</table>

**Beginner/Intermediate**

The **Beginner/Intermediate** strand will be most appropriate for those who are just getting started, and may need some foundational information. The **Intermediate/Advanced** strand assumes a general base of knowledge and/or experience.

These categories are not strictly defined. You should feel free to talk to the instructors listed to determine which sessions will best suit your needs after reading the session descriptions on the following pages.
# Schedule-at-a-Glance

### 2019 Adirondack Sky Center & Observatory Astrophotography Conference

<table>
<thead>
<tr>
<th>Saturday, October 5</th>
<th>Location</th>
<th>Instructor</th>
<th>Beginner/Intermediate Strand</th>
<th>Intermediate/Advanced Strand</th>
<th>Location</th>
<th>Saturday, October 5</th>
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<tbody>
<tr>
<td>9:00 AM - 11:00 AM</td>
<td>Roll Off Roof Observatory</td>
<td>Tim Connolly</td>
<td>Skill Building - Hands-On Imaging: Solar Imaging</td>
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<tr>
<td>11:00 AM - 12:00 PM</td>
<td>On Your Own</td>
<td></td>
<td></td>
<td>Lunch &amp; Break</td>
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<tr>
<td>12:00 PM - 1:50 PM</td>
<td>MHS Auditorium</td>
<td>Panel Discussion</td>
<td>Choosing the Right Gear</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2:00 PM - 4:00 PM</td>
<td>MHS Computer Lab A</td>
<td>Andy Metz, Seth McGowan, Tim Connolly</td>
<td>Skill Building - Hands-On: Image Stacking &amp; Processing Deep Sky and Widefield Foreground Blending</td>
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</tr>
<tr>
<td>4:00 PM - 6:00 PM</td>
<td>On Your Own</td>
<td></td>
<td>Dinner</td>
<td></td>
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</tr>
<tr>
<td>6:00 PM - 7:00 PM</td>
<td>Roll Off Roof Observatory</td>
<td>Groups and Facilitators</td>
<td>Skill Building - Field Setup: Equipment / Polar Alignment / Troubleshooting</td>
<td></td>
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</tr>
<tr>
<td>7:00 PM - 12:00 AM</td>
<td>Roll Off Roof Observatory</td>
<td>Skill Building - Hands-On Imaging: Widefield</td>
<td></td>
<td>7:00 PM - 8:00 PM</td>
<td>Roll Off Roof Observatory (Inside)</td>
<td></td>
</tr>
<tr>
<td>12:00 AM</td>
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<td><em>Breakdown for the Night</em></td>
<td></td>
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<table>
<thead>
<tr>
<th>Sunday, Oct 6</th>
<th>Location</th>
<th>Instructor</th>
<th>Beginner/Intermediate Strand</th>
<th>Intermediate/Advanced Strand</th>
<th>Location</th>
<th>Sunday, Oct 6</th>
</tr>
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<tbody>
<tr>
<td>10:00 AM - 12:00 PM</td>
<td>MHS Computer Lab</td>
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<td>Optional - Guided Image Processing Practice (open lab)</td>
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<tr>
<td>12:00 PM - 1:00 PM</td>
<td>On Your Own</td>
<td></td>
<td>Lunch &amp; Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:00 PM - 3:00 PM</td>
<td>MHS Auditorium</td>
<td>Group</td>
<td>Skill Building - Hands-On: Image Stacking &amp; Processing</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3:30 PM</td>
<td>MHS Auditorium</td>
<td></td>
<td>End of Program/Slideshow of Participants Work</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Beginner/Intermediate
### Intermediate/Advanced
Roll Off Roof Observatory
178 Big Wolf Road
Directions to the Observatory from Main Street (Rt. 3):
• Turn onto Washington Street and drive 0.6 miles.
• Turn left onto Coney Beach Avenue, which turns into Little Wolf Road.
• After about 0.3 miles, continue straight up the hill onto Big Wolf Road.
• The observatory entrance will be on your left.

Office, Gift Shop, and Classroom
36 High Street

Tupper Lake Middle/High School
25 Chaney Avenue
Parking off of Park Street Entrance (Behind the Building)
Access to Computer Lab (Room A114), and Auditorium
### Technical Details

**Astrophotography Specific Software**  
DeepSkyStacker is a freeware for astrophotographers that simplifies all the pre-processing steps of deep sky pictures of registering, stacking, and simple post-stacking processes to quickly view the final result as a TIFF or FITS file (16 or 32 bit).

Sequence Generator Pro is a powerful sequencing engine. With it you can coordinate a wide variety of equipment including cameras (CCD and Canon DSLRs), color filters, focus controllers and telescopes. String together any variety of targets and events you can imagine in order to capture "light", "dark", "bias" or "flat" frames (you can even use events to define "pause" or "mount park" events).

PixInsight is an advanced image processing software platform. It has been designed specifically for astrophotography and other technical imaging fields. PixInsight is a modular, open-architecture system where the entire processing and file handling capabilities are implemented as external installable modules.

Astro Pixel Processor is one of the main goals in the development of APP, is to make a complete Deep Sky Image Processing application that maintains ease of use while automatically using the most advanced algorithms to provide excellent results without the need to tweak dozens of parameters. APP will give very good results with default parameters on a wide range of datasets.

Sequator is a free software which can track stars on multiple images, align stars and stack them. If you don't have an equatorial mount, by stacking non-blur star images in short-time exposures, the result will be almost similar to long-exposure on an equatorial mount. However, Sequator can control the exposure properly by auto-brightness or HDR-mode output, in 16-bit TIFF for further post processing. Additionally average random noises, rather than over-exposed on a physical equatorial mount.

### Internet Access & Logins

<table>
<thead>
<tr>
<th>Office, Giftshop &amp; Classroom Wifi</th>
<th>Roll Off Roof Observatory Wifi</th>
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</thead>
<tbody>
<tr>
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<td>Network: RORO</td>
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<tr>
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<table>
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<tr>
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<th>Middle/High School Computer Workstations</th>
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<tbody>
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<tr>
<td>Username: sub</td>
<td>Password: workshop</td>
</tr>
<tr>
<td>Password: teacher</td>
<td></td>
</tr>
</tbody>
</table>
Thursday, October 3rd

Meet & Greet
Format: Discussion/Presentation
10:00 AM - 12:00 PM
ASC Classroom A
36 High Street
The objective of this introductory session is to establish a welcoming environment for you, as well as an overview of the sessions you will attend, and the outcomes you can expect throughout the weekend. This will also be a time when introductions will be made of instructors as well as participants. Each participant will be able to identify an instructor who "speaks" to them, and will become their go-to person for the duration of the conference.

Instructional Session:
Principles of Astrophotography
Format: Instruction/Presentation
2:00 PM - 4:00 PM
Classroom A
36 High Street
This initial instructional session will provide you with a uniform background of principles and vocabulary for use throughout the weekend. Topics will include Photography, Mounts, Polar Alignment, Polar Scopes, and Telescopes. You will have the opportunity to ask questions and clarify understandings throughout the session.

Instructional Session:
Introduction to Widefield Astrophotography
Format: Instruction/Presentation
2:00 PM - 4:00 PM
Classroom B
36 High Street
This session provides an overview of how to utilize a standard DSLR & lens to capture wide field images of the night sky, often in combination with foreground elements. We will discuss DSLR setting, lens optics & aberrations, focusing at night, polar alignment image calibration and stacking. This should provide all tool you need to execute wide field astrophotography on your first night but also serves and a foundation for the following day's material.

Skill Building
Field Setup: Equipment
Format: Hands On
6:00 PM - 8:00 PM
*Roll Off Roof Observatory/Middle High School
178 Big Wolf Road
The skill building session will focus on the application of information taught during the daytime lessons. Each of the three night sessions at the Roll Off Roof Observatory will give you the chance to set-up equipment in the field. This real-world practice will enable you to better utilize your own equipment at home. *If the weather does not permit outdoor setup, we will move the session inside to troubleshoot equipment setup and/or connections.
Skill Building - Hands-On Introduction to Astrophotography: Deep Space & Wide-field, Plus Polar Alignment

Format: Hands On
7:00 PM - Midnight
Roll Off Roof Observatory
178 Big Wolf Road

The skill building session will also focus on the application of the Principles of Astrophotography taught during the daytime lessons. Each of the three night sessions at the Roll Off Roof Observatory will give you increasingly advanced practice in imaging, and will also enable you to better utilize your own equipment at home. Additionally, three special instructional sessions will be held to demonstrate two methods of polar alignment — Using Pole Master, using PHD’s Drift Alignment Tool, and ZWO ASIAir.

Friday, October 4th

Skill Building
Hands-On Astrophotography:
Backyard Solar Imaging & Preparing for the Mercury Transit

Format: Hands On
10:00 AM - 12:00 PM
Roll Off Roof Observatory
178 Big Wolf Road

For those interested in imaging our Sun and getting ready for the transit of Mercury across its surface, Tim Connolly will help you get started, or bring your images to a new level. This session is optional, and participants are encouraged to attend even if only to “check it out” for the future. Since there is some overlap with other sessions, we also encourage participants to come and go at their own schedule.

Instructional Session
Tracked Long Exposure Astrophotography - Part I

Format: Instruction/Presentation
10:00 AM - 12:00 PM
Classroom B
36 High Street

Transitioning from wide field to long exposure deep sky astrophotography brings tighter tolerances, new equipment and techniques. We will discuss advanced polar alignment, auto-focus, German equatorial mounts and sources of variation in tracking as well as how to mitigate these errors with auto-guiding. These comprise the foundations of deep sky astrophotography.

Instructional Session
Cameras, Equipment, Settings, & Files

Format: Instruction/Presentation
2:00 PM - 2:50 PM
Classroom A
36 High Street

This more advanced instructional session will increase your knowledge of the details used in astrophotography. Topics will include DSLR-Modifications, CCD, Planetary & Solar imaging, Field Flatteners, Focal Reducers, Autoguiding solutions, Cameras, On and Off Axis Scopes, Camera Settings such as Exposures, Shots, Filters, and special files such as, Light, Dark, Bias, and Flats Frames used in the Stacking Images. You will have the opportunity to ask questions and clarify understandings throughout the session.
Instructional Session
Tracked Long Exposure Astrophotography - Part II
Format: Instruction/Presentation
2:00 PM - 2:50 PM
Classroom B
36 High Street

The last session in this track explores intermediate techniques for improving image quality based on specific issues typically encountered in the hobby. This will include method/software enabled techniques like drizzle, dithering, HDR as well as an in depth look into filters, narrowband imaging and how to utilize this data. Next we will talk about how to do all of this more easily & efficiently with automation. Lastly we wrap up with session planning resources and general sources of information.

Skill Building
Field Setup: Equipment & Polar Alignment
Format: Hands On
6:00 PM - 7:00 PM
Roll Off Roof Observatory
178 Big Wolf Road

The skill building session will focus on the application of information taught during the daytime lessons. Each of the three night sessions at the Roll Off Roof Observatory will give you the chance to set-up equipment in the field. This real-world practice will enable you to better utilize your own equipment at home.

Skill Building
Hands-On Astrophotography: Widefield
Format: Hands On
7:00 PM - Midnight
Roll Off Roof Observatory
178 Big Wolf Road

The skill building session will focus on the application of the use of Cameras, Equipment, Setting, and Files taught during the daytime lesson. You will store image data on provided SD cards for use in the next day’s Imaging and Stacking session. Each of the three night sessions at the Roll Off Roof Observatory will give you increasingly advanced practice in imaging, and will also enable you to better utilize your own equipment at home. Additionally, two special instructional sessions will be held to demonstrate two methods of polar alignment — Using Pole Master, and using PHD’s Drift Alignment Tool.

Skill Building
Frame Evaluation Before Processing
Format: Presentation/Discussion
3:00 PM - 4:30 PM
Classroom B
36 High Street

It is sometimes hard to know which light, or sub frames to include in the stacking process. There are tools that allow us to evaluate each frame in order to choose only the highest quality data in our final image. During this session, those tools will be demonstrated using preselected data, but you will also have a chance to contribute your own frames to be included in the presentation and the evaluation process.
Skill Building
Hands-On Astrophotography: Planetary Imaging of Mars, Neptune, and Uranus
Format: Hands On
8:00 PM - Midnight
Roll Off Roof Observatory
178 Big Wolf Road

The skill building session will focus on the application of the use of Cameras, Equipment, Setting, and Files taught during the daytime lesson. You will store image data on provided SD cards for use in the next day’s Imaging and Stacking session. Each of the three night sessions at the Roll Off Roof Observatory will give you increasingly advanced practice in imaging, and will also enable you to better utilize your own equipment at home.

Saturday, October 5th

Skill Building
Hands-On Astrophotography: Solar Imaging
Format: Hands On
9:00 AM - 12:00 PM
Roll Off Roof Observatory
178 Big Wolf Road

For those interested in imaging our Sun, Tim Connolly will help you get started, or bring your images to a new level. This session is optional, and participants are encouraged to attend even if only to "check it out" for the future. Since there is some overlap with other sessions, we also encourage participants to come and go at their own schedule.

Panel Discussion
Choosing the Right Gear
Format: Instruction/Presentation
12:00 PM - 1:50 PM
Tupper Lake Middle/High School Auditorium
25 Chaney Avenue

With all of the possible combinations of telescopes, cameras, guiding options, etc. it is sometimes difficult to feel like you are making an informed decision about what to purchase. And, sometimes, the equipment you already have is not perfectly suited to the objects you wish to photograph. This session is intended to discuss the specifics of your equipment needs. The panel will answer questions you have about choosing the right equipment for the job. Bring plenty of questions, we are ready to help.

Skill Building
Image Stacking & Processing Deep Sky & Widefield Foreground Blending
Format: Instruction/Presentation
2:00 PM - 4:00 PM
Tupper Lake Middle/High School Computer Lab
25 Chaney Avenue

This is the session that will get you fully emerged in the image processing stages. Each participant will have a folder already setup on a workstation in the computer lab fully equipped with all the software you will need to process your images. We will start with the stacking process in Deep Sky Stacker as well as Astro Pixel Processor. The full group will then be separated by need. A PixInsight group will move to another location for more advanced work, while the remainder of the group delves into Photoshop, Lightroom, and Sequator. A set of files will be available to work with if you could not capture enough on your own.

Skill Building
Field Setup: Equipment & Polar Alignment
Format: Hands On
6:00 PM - 7:00 PM
Roll Off Roof Observatory
The skill building session will focus on the application of information taught during the daytime lessons. Each of the three night sessions at the Roll Off Roof Observatory will give you the chance to set-up equipment in the field. This real-world practice will enable you to better utilize your own equipment at home.

**Skill Building**

**Guided Image Processing Practice** (Optional)

Format: Instruction/Presentation  
10:00 AM - 12:00 PM  
Tupper Lake Middle/High School Computer Lab  
25 Chaney Avenue  
Sometimes a little quite practice helps to solidify processing steps. This time has been found to help participants work quietly on their own with the help of the instructors on an as-needed basis.

**Skill Building**

**Image Stacking & Processing**

Format: Instruction/Presentation  
1:00 PM - 3:00 PM  
Tupper Lake Middle/High School Computer Lab  
25 Chaney Avenue  
During this final session, you will refine your image processing skills. All of the instructors will be on hand to guide you and answer questions at all levels. You will have the option to print your favorite image during this session, and we will gather a few images from each participant for a final slide show of your accomplishments.

**Skill Building**

**Hands-On Astrophotography: Putting It All Together**

Format: Hands On  
7:00 PM - Midnight  
Roll Off Roof Observatory  
178 Big Wolf Road  
Knowing what you have experienced in the previous imaging, as well as processing session, you should be well equipped to begin making decisions about what settings, etc. will bring out the results you desire. This final imaging session will give you the opportunity to put all of your knowledge and skills together to produce stunning results during the final stacking and processing session on Sunday morning.

**End of Program Presentation of Images**

Format: Instruction/Presentation  
3:30 - 4:00  
Tupper Lake Middle/High School Auditorium  
25 Chaney Avenue  
This is your opportunity to show off what you have achieved during the Astrophotography Workshop. A final slide show presentation will include images from everyone who attended. Final thoughts and discussion, as well as any remaining questions will conclude the weekend’s event.
Messier 51 (M51, NGC 5194) is the famous "Whirlpool" galaxy in Canes Venatici. It is one of the most conspicuous and best-known spiral galaxies in the sky. M 51 is interacting with its much smaller neighbor, NGC 5195; the two galaxies may be seen with binoculars under very dark skies.

*In Canes Venatici. Transits 1:55 PM.*

Messier 101 is a very large, relatively nearby, face-on spiral galaxy in the constellation Ursa Major. It is also known as the Pinwheel Galaxy.

*In Ursa Major. Transits 2:28 PM.*

The Great Andromeda Galaxy, Messier 31, is the nearest spiral galaxy to our own. Visible as a faint smudge on moonless nights, it is one of the farthest objects visible to the naked eye. As a mirror image of the Milky Way, this huge aggregation of stars, gas, and dust allows us to study all the features of our own galaxy that we cannot observe because we are inside it.

*In Andromeda. Transits 1:10 AM.*

Messier 16 is a conspicuous region of active star formation, appearing in the constellation Serpens Cauda. This giant cloud of interstellar gas and dust is commonly known as the Eagle Nebula, and has already created a cluster of young stars. The nebula is also referred to the Star Queen Nebula and as IC 4703; the cluster is NGC 6611.

*In Serpens. Transits 6:44 PM.*

Messier 17 in Sagittarius is one of the brightest diffuse nebulae in the sky. Commonly known as the Omega, Swan, Horseshoe, or (especially in the southern hemisphere) Lobster nebula, M 17 is just visible to the naked eye under very favorable conditions.

*In Sagittarius. Transits 6:46 PM.*

The North America Nebula, NGC 7000, is an emission nebula in the constellation Cygnus, close to Deneb (its brightest star). It measures 3 degrees north to south and 2.3 degrees east to west, and covers an area more than four times the size of the full moon.

*In Cygnus. Transits 9:23 PM.*
Messier 13, also designated NGC 6205, and sometimes called the Great Hercules Cluster, is considered the most spectacular globular cluster in northern skies. In Hercules. Transits 5:06 PM.

Messier 57 (NGC 6720) is the famous Ring Nebula. It is a showpiece in the northern hemisphere summer sky, and often regarded as the prototype of all planetary nebulae. These objects are the remains of sunlike stars which have blown away their outer envelopes, leaving planet-sized white dwarfs at their centers. In Lyra. Transits 7:18 PM.

The globular cluster Messier 22 in Sagittarius, also known as NGC 6656, is one of the brightest in the sky, and among the first to be discovered. In Sagittarius. Transits 7:01 PM.

M 27, commonly known as the Dumbbell Nebula, is the first planetary nebula ever discovered, and perhaps the finest in the sky. It is easily seen in binoculars, and a popular observing target for amateur telescopes. In Vulpecula. Transits 8:24 PM.

The Pleiades star cluster is also known as the Seven Sisters, and as Messier 45. It is a prominent object in the night sky with a conspicuous place in ancient mythology. The cluster is among the nearest to Earth, and the most obvious to the naked eye. Although only a handful are visible to the unaided eye, it contains hundreds of stars, some of them surrounded by swirls of nebulosity. In Taurus. Transits 4:14 AM.

Messier 37 is the brightest open cluster in Auriga, and is considered to be one of the finest in the sky. In Auriga. Transits 6:19 AM.

Messier 13, also designated NGC 6205, and sometimes called the Great Hercules Cluster, is considered the most spectacular globular cluster in northern skies. In Hercules. Transits 5:06 PM.

Messier 57 (NGC 6720) is the famous Ring Nebula. It is a showpiece in the northern hemisphere summer sky, and often regarded as the prototype of all planetary nebulae. These objects are the remains of sunlike stars which have blown away their outer envelopes, leaving planet-sized white dwarfs at their centers. In Lyra. Transits 7:18 PM.

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The Adirondack Sky Center & Observatory has a board of directors that is second to none. Comprised of astronomers and university professors, teachers, amateur astronomers, and business people, we share one common goal: to construct and operate an astronomical observatory in the Adirondack Mountains.

**Executive Board**

**President:** Carol Levy — *Amateur astronomer*

**Vice President:** Seth McGowan — *Superintendent of Schools, Tupper Lake Central School District*

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Tom Wojtkowski — *Director of Engineering, MORGOIL® Bearing Division of Siemens Industry Inc. (Worcester, MA)*
Art Cacciola

Art was born in NYC. His first teaching job was in Westchester County after which he relocated to the Finger Lakes region and has taught in various roles for 46 years. Art retired from teaching in 2008. While teaching, he developed student clubs in order to be able share his love of photography and astronomy. Today he often teaches and volunteers at Kopernik Observatory, he is the amateur astronomer for the Girl Scouts and serves his community as a volunteer EMT and Fireman.

His interest in astronomy began in 1957, when his dad showed him Sputnik 1, as it orbited overhead. His father fed his interest in astronomy by buying him books and a pair of binoculars. In 1969, his father again helped develop another of his life-long interests - a love of photography by giving him a manual SLR camera. In college, his two interests merged and he began experimenting with astrophotography.

In 1989 Art was recruited by Kopernik Observatory and Science Center first as a judge of students’ projects and then as a teacher and volunteer. He is an active member of the Kopernik Astronomical Society. A few years ago, he was contacted by Carol Levy from the Adirondack Public Observatory. The Adirondack Sky Center & Observatory was developing plans and felt that KOSC would be a good model for the Adirondack Sky Center & Observatory. Art serves on the Adirondack Sky Center & Observatory board as a consultant as plans and strategies are developed.

Art is married to his wife of 45 years, Cartha, and they have two adult children, a daughter Christina and a son, Michael. His daughter has recently renewed her interest in astronomy and has shown an interest in astrophotography as well.

Art credits his longtime friend and astronomy partner, George Normandin, another KAS member, with teaching him about the more complicated techniques in astrophotography.

Nathan Duso

Nathan P. Duso lives in Malone, New York with his wife, 16yr old son and his 2 stepsons who are 18 and 20yrs old. His stepsons are currently serving in the Army and Marine Corp. Nathan is a recent graduate of S.U.N.Y Potsdam with his Bachelors degree in Graphic Design with a concentration in communication. He is currently a nutrition aide at Elderwood of Uhlien in Lake Placid, New York.

Nathan has always been interested in photography and astronomy. He purchased his first telescope 11y’rs ago and began taking pictures with it in 2016. His grandfather Kenneth Williams of Saranac Lake, NY, was an astrophotographer as well. Nathan enjoys helping others with astrophotography in online groups of the astronomy community. Nathan’s motto is, “Strive to learn something new everyday.”

Nathan loves taking pictures of deep space objects such as Galaxies and Nebulas. His telescope of choice is of the schmidt cassegrain design. He currently is using a Celestron EdgeHD 11inch SCT. This telescope is equipped with a .7 focal reducer bringing it’s F-ratio to F7.
Tim J. Connolly

Tim J. Connolly lives in Saranac, New York with his wife and four year old son. He served in the United States Air Force, and currently is an Investigator with the New York State Police. Tim is on the Advisory Board for the Adirondack Sky Center, and started taking space pictures in 2013. His father and grandfather, also named Tim, were astronomy enthusiasts and it was passed down to him at an early age. Tim is a tester for ZWO Astronomy Cameras and has a lot of experience with new and upcoming astrophotography equipment.

Tim enjoys imaging everything in the night sky to include asteroids, comets, galaxies, nebulae, star clusters, planets, the moon and the sun. His favorite scope to use for deep space imaging is a Celestron 9.25” EdgeHD SCT with a Hyperstar lens which brings the focal ratio down to f2.2.

Tim has conducted several astrophotography workshops for the Adirondack Sky Center, including a Solar Imaging Workshop, in advance of the Great American Solar Eclipse, and was featured on the day of the Eclipse at our event. He has also presented at the North East Astro Imaging Conference and on The Astro Imaging Channel. With a natural tendency toward teaching, Tim has spent a great deal of time and energy organizing this weekend’s Astrophotography Workshop.

Tim P. Connolly

Tim acquired his knowledge in astrophotography mostly from online reading about equipment and most important, field experience. He believes a great deal of this came from first hand experience, troubleshooting technical equipment, computer software glitches and how to deal with weather issues. Passion for astronomy is a strong tool to persistently find a way to overcome errors and troublesome issues.

Tim spent his life growing up as a Navy brat in the Pacific Far East. He was born in San Jose, California, but spent his child life in elementary school to junior high in Japan and attended high school on Guam.

Tim met his wife Teresa on Guam in his junior year, and they now have three children. They both received their degrees at University of Iowa.

After working at Johns Hopkins, Baltimore, Pfizer Pharmaceutical, Tim is now retired from Baystate Medical Center in Massachusetts and is employed by the University of Vermont as a Senior Research Technician. Tim’s favorite constellation is Orion and he uses a Celestron 8” SCT with a Hyperstar lens.
Instructor Bios

Gordie Duval

Gordie Duval is a founding member of the Adirondack Sky Center and Observatory. Gordie grew up in Tupper Lake. He and his wife, Judy, live and raised their growing family in right here. Gordie retired from the Tupper Lake High School as a physics and astronomy teacher as well as an amateur astronomer and astrophotographer. In 2005, as a response to the establishment of the Adirondack Sky Center and Observatory, Gordie developed and introduced an astronomy course at the local high school which included basic astrophotography.

Gordie has become the resident expert in single-shot astrophotography. This method that requires all of the data contained within an image is captured with the camera shutter opening only one time. With little post-processing, his stunning photography set a high standard.

Currently, Gordie develops and presents educational astronomy outreach programs for the Adirondack Public Observatory including Friday night public stargazing as well as private star parties... when he’s not paddling, biking or hiking in the Adirondacks.

Seth McGowan

Seth McGowan is the Superintendent of Schools in Tupper Lake. He began his career as an instrumental music teacher in 1987. After developing software to assist in his musical compositions and arrangements, he became a technology coordinator and grant writer for the Tupper Lake Central School District. In 2002, he was appointed as an administrator in the District as a Principal, and ultimately to his current position. He and his wife Susan raised their three children Laura, Scott, and Sarah, in Tupper Lake.

Seth’s interest in astronomy began at the age of five when he received his first telescope. Having grown up in the Bronx, NY there were few opportunities to view the night sky. However, his fascination with the night sky has never diminished.

Although relatively new to his involvement with the Adirondack and Sky Center and Observatory in 2015, his is currently the Vice President and chair the Education Committee.

Within the past few years, he has learned a great deal about astrophotography, and has worked mostly using the ASC’s C14. During the school year, he conducts programs in the StarLab for every classroom at the Elementary School.
Instructor Bios

Andrew Metz

Andrew [Andy] Metz was born in Wayne, Nebraska, a small town in the northeast corner of the state. He earned degrees in chemistry from the University of Nebraska-Lincoln and Northwestern University before beginning a career in the semiconductor industry at Intel in Hillsboro OR, and he has been with Tokyo Electron Ltd. in Albany since 2007. Andy lives in Colonie, NY with his wife, Jodi, a chemistry professor, and their cairn terrier, Finn.

Andy's parents were both professors at the small college in his hometown. His father taught physics, and a close family friend ran the planetarium at the college so he went to shows from a very young age. While he was in elementary school, his father co-taught an aerospace summer workshop for area science teachers' continuing education and Andy was a regular attendee, gaining exposure to opportunities that included lectures from NASA scientists. He frequently spent time in the backyard with a trusted pair of binoculars looking up at the night sky, his dad helping him identify different objects. In 1986, he spent an evening on the roof of his dad's science building trying to observe Halley's comet's last appearance though the department's telescope. While he doesn't remember seeing much, that night sticks in his mind at his first real foray into observational astronomy with a telescope.

Andrew started trying to image the night sky in 2015. He started with a DSLR and a tripod, but quickly got a star tracker for Christmas from his thoughtful wife -- thus began the obsession and the never ending regret of his wife, when hubby is outside, alone, in the dark...

Andrew enjoys wide field Milky Way astrophotography, but is particularly interested in imaging nebula and galaxies. His recent excursions into narrowband imaging are quite gratifying from his light polluted suburban home.

George Normandin

George Normandin was born in Cohoes, NY, and currently resides with his wife Kim in Binghamton (and sometimes Indian Lake.) His extensive career ranged from a cost analyst to later a contracting officer in the US Defense Logistics Agency as part of the Department of Defense. He retired as a Lieutenant Colonel with more than 28 years as an Officer in the Regular Army, National Guard, Army Reserve.

When George's aunt gave him the Golden Book of Astronomy for his 9th birthday, he was hooked on astronomy. He has owned a scope ever since. He did his first astrophotography in 1961 and went thru the “film era”. He started digital imaging in 1993 with one of the first commercial CCD cameras sold — an SBIG ST-6.

George has taken approximately 5,000 images and is published in Sky & Telescope, Astronomy, Sue French's book Deep Sky Wonders and various European magazines. He is also a member of the Adirondack Sky Center & Observatory.

Although he still feels like he has a lot to learn, he is hopeful for some clear skies to image thru. He is also an avid visual observer, mostly with his 20-inch Dobsonian telescope.
The Adirondack Sky Center & Observatory is a 501(c)(3) non-profit organization. Our mission is to provide quality educational experiences for people of all ages through the science, technology, and history of astronomy.

### Membership Levels and Benefits

- **Luna Level: Individual Membership** $35
- **Star Level: Family Membership** $55
- **Comet Level: Friend Membership** $100 - $499
- **Nebular Level: Supporter Membership** $500 - $999
- **Galaxy Level: Benefactor Membership** $1000 - $4999
- **Silver Universe Level: Silver Patron Membership** $5000 - $9999
- **Gold Universe Level: Gold Patron Membership** $10,000 and above

### Payment Options

Send your check, payable to The Adirondack Sky Center & Observatory, to:
The Adirondack Sky Center & Observatory, Inc.
P.O. Box 1332
Tupper Lake, NY 12986
Please indicate the level at which you'd like to join.

### Donation Information

The Adirondack Sky Center & Observatory is a not-for-profit 501 (3) (c) organization. The APO has compiled a special "wish list" of items which will aid us in our primary mission: to provide a quality educational experience for people of all ages through the science, technology, and history of astronomy. Your donation of any of these items will be of great help to us in support of this mission.

Receive a 25% tax credit for your donation to the Adirondack Sky Center & Observatory Building Fund!

As of January 31, 2007 the Adirondack Sky Center & Observatory Building Fund is an approved community development project of the Franklin County Empire Zone. This means that the Adirondack Sky Center & Observatory can offer a tax credit on New York State personal or corporate income taxes worth 25% of your donation (monetary contributions only) to the observatory building fund if made on or after January 31, 2007. For example, if you contribute $1,000 to the fund, you could receive a tax credit worth $250 on your New York State taxes. Please note that each taxpayer has a lifetime limit of $100,000 in Total Zone Capital Credits for community development projects.

In addition to the Zone Capital Credits, your donation may also be eligible for federal and state charitable deductions. Please consider whether the availability of these Zone Capital Credits will allow you to make a larger contribution to the observatory building fund and contact us to verify that your donation is eligible. If so, all you need to do is fill out Form 27 and return it along with your contribution.

The Adirondack Sky Center & Observatory's annual financial filings are available for public review.
Interest from across the U.S. northeast and the local community has spurred the organization to aim to establish a permanent Adirondack center for astronomy and space science, the AstroScience Center, at the site. Complementing The Wild Center natural history museum, the ASC’s AstroScience Center will greatly expand science, technology, engineering, and mathematics (STEM) learning in the region, while also strengthening Tupper Lake’s appeal as a meaningful travel destination.

The ASC completed Phases 1 and 2 and is working on Phase 3 now. Phase 1 focused on development of a Roll-off Rooftop Observatory (RORO), completed in 2012, where stargazing takes place year-round. In 2016 Phase 2 was completed, wherein Envision Architects worked with the then-Adirondack Public Observatory to develop options for site and building plan concepts. A preferred concept design has been selected and developed with a cost estimate. Phase 3 includes finalizing designs and Phase 4 is building the AstroScience Center, and a Research Telescope building, is Phase 5.

When complete, the Center will have many day-time events and offerings, including a Planetarium, a modern style with room-edge projectors and all-seating viewing; a Lecture Hall (which will be available for renting out), appropriate for lectures, concerts, etc.; an Interactive Classroom, where visitors can do self-guided hands-on activities and classes can have guided discussions, robot building, arts classes, and more; with 14,000 sf of public space, plus 3,000 sf of space in the basement.

Now in a Capital Campaign to help fund Phases 3, 4, & 5, the Sky Center invites residents and visitors across the Adirondack region to experience the thrill of possibility this ambitious project offers by making a generous donation today.

Call 518-359-3538 to find out how.
Popular Restaurants

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79 Main Street
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(518) 359-2910

Little Italy
146 Park Street
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Guido's Pizza
116 Park Street
(518) 359-2958

Well Dressed Foods
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(518) 359-0064

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Jreck Subs
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