

*\*enktêsis*  
*\* building value  
developing ideas*

<http://enktesis.com>  
v22/Jan 2019



## Photography Guidelines for FIRST INSPIRES Events

And other STEM  
Competition Events

# MAKE MAGIC



Our goal is to  
make magic. Tell  
a story. Capture  
the action. Freeze  
the moment of  
success, failure,  
and learning.



# Make Magic

**“Bad media is worse than no media.”**

*Marco Ciavolino*

**“If you only show people your good photographs they will think you are a great photographer.”**

*Don Regier*

**“To me, photography is an art of observation. It’s about finding something interesting in an ordinary place. I’ve found it has little to do with the things you see and everything to do with the way you see them.”**

*Elliott Erwitt*

**“People love pictures of people they love.”**

*Susan Cody*

## So do it well.

## Contents

Photog Guidelines for FIRST INSPIRES Events .....	1
Contents.....	3
Your goal is simple: Tell the story well .....	4
Maryland Organizations .....	5
Organize your shoot: The essentials .....	6
Success doesn't happen by chance. ....	6
Simple key points .....	6
Shooting basics: Shoot at 90% full of full frame .....	8
Use good folder structures and file naming .....	8
Make sure you have reliable internet access.....	8
Bring some key equipment .....	8
Use file renaming software.....	9
Learn how to Sort Photos.....	9
Plan Your Event .....	10
Event preparation.....	10
Logistics .....	10
Shoot planner .....	10
Specific Shot Instructions .....	11
STEM-specific principles.....	11
Keep it steady.....	11
Get on the students' level .....	11
Shoot down .....	11
Turn off flash .....	11
High-speed line shooting: High-fives, trophies, and run-ins....	11
Field Shooting.....	11
Sequence instructions.....	11
Specific situations.....	12
Working a big floor (particularly <i>FIRST LEGO</i> League).....	12
Comments on using a flash at events .....	13
When not to use a flash .....	13
When a flash can work.....	13
All the shots .....	14
General shots .....	14
Refs .....	14
Special required (check with event coordinator).....	14
Volunteers .....	14
FRC, FTC, FLL & FLLJr.....	15

Teams.....	15
General .....	15
Venue .....	15
Brief notes on shooting video .....	16
Planning a 'day of event' video.....	17
Sharing your work.....	18
Sample event videos .....	19
Sample photos .....	20
At the tables/fields.....	20
Project/interview shots.....	21
Shooting the pits .....	22
Shooting the bots .....	24
Run-in/entrance/introduction photos .....	25
Alliance selection .....	26
Awards.....	27
Full area.....	28
Judges and volunteers .....	28
FIRST LEGO League Jr. ....	28
Explaining projects.....	29
Bonus 1: Software resources.....	30
Bonus 2: Create 360-degree photospheres .....	31
Using the Google app .....	31
Using a dedicated spherical camera .....	32
General photosphere techniques.....	33
Advanced photosphere techniques.....	33
Bonus 3: Learn from great photographers.....	34
Online Resources .....	34
Justin Kase Conder: Great Images .....	35
Tony & Chelsea Northrup .....	36
Bonus 4: Don't forget start and end of season photos .....	37
Pre-Season: From first meeting to first competition .....	37
Post-Season: From last competition until the next season .....	37
Bonus 5: File Naming So You Can Find Your Work.....	38
Bonus 6: Folder Naming and Versioning.....	39
Bonus 7: Sorting and editing photos.....	40

# Your goal is simple: Tell the story well

## Please Read This Page Three Times

This document is written to help you plan media coverage of your STEM event. Random shots and photos collected from friends, phones, and family will yield a confused set of images. A well-organized shoot will yield great shots of each area, include nearly all participants, and provide a usable resource that will serve you well into the future.

You will be looking for those moments of triumph and learning and failure that illustrate the outcomes of this effort: To teach young engineers.

Your finished work will show smiling, engaged children and helpful adults. It will feature hard working, compassionate volunteers in all areas. It will showcase innovative research and design.

Along the way, you must try to get every team and participant in at least one picture if not more. Why? People love pictures of people they love. You will also want to show the excitement of the spectators and messages of the special speakers.

These compelling visuals will come to life in the context of the amazing facilities that schools and organizations make available to these programs.

Your work will record all of this to preserve the day. It will curate the outcome of months of hard work for teams, mentors, and parents.

**Media done well will make you an important part of the event and its success.**

// Marco Ciavolino  
Partner, Enktesis LLC  
Executive Director, TechBrick Education

**Note:** We want to hear from you. Corrections? Ideas for new content? Success stories? Praise? Let me know! Or if you would like to translate this document or re-use it, please contact me at [marco@enktesis.com](mailto:marco@enktesis.com)



# Maryland Organizations

The purpose of this guide is to support the FIRST INSPIRES events in Maryland as well the many other STEM-oriented activities in the region. The organizations listed below are the key players in the Maryland region. Please visit their websites to learn more. We hope this guide will assist similar organizations and events throughout the world.

## \*enktesis

Enktesis / Document Author  
Key Supporter of TechBrick Robotics and Provides Services to many FIRST in MARYLAND events.  
<https://enktesis.com>

\*enktesis, LLC is a private consultancy, led by Marco Ciavolino, assisting clients in a range of web technology solutions, marketing communications, business development, and communications research efforts. He has been involved in the web space since 1995 and since that time has directly developed and collaborated on numerous web projects from small niche sites to large enterprise projects. Marco has been involved with FIRST INSPIRES events since 2003 as is the executive director of TechBrick and member of the state FLL committee. Marco has written many instructional guides and documentation for a wide range of products and software.



TechBrick Robotics  
Runs multiple FLLr, FLL, FTC, and FRC teams in Maryland. Provides a wide range of free resources for teams.  
<http://techbrick.com>

TechBrick, formed in early 2003, is an independent robotics and STEM education club for home-schooled, public, and private school students in Harford, Baltimore, and Cecil counties. We have more than 100 active registrations with weekly meetings of children and parents (who are encouraged to stay and participate). Our teams have participated in numerous championships both regionally and at World's.



Maryland FIRST LEGO League  
Coordinates FLL efforts in Maryland  
<https://marylandfll.org>

FIRST LEGO League (FLL) is a result of an exciting alliance between FIRST and the LEGO Company. Guided by adult mentors and their own imaginations, FLL students solve real-world engineering challenges and develop important life skills.



FIRST Chesapeake  
Coordinates FRC efforts throughout the Chesapeake Region  
<https://www.firstchesapeake.org>

FIRST Chesapeake, dba VirginiaFIRST, is an independent non-profit that brings STEM-based leadership programs to students in the District of Columbia, Maryland, and Virginia. Robotics is the means to teach technical concepts and practical know-how, as well as to build leadership skills and develop teamwork. What makes us unique is our access to the continuum of K-12 programs developed by FIRST.



FIRST in MARYLAND  
Coordinates all FIRST INSPIRES activities in Maryland  
<https://firstinmaryland.org>

This website supports the Maryland programs of FIRST, a non-profit organization founded by inventor Dean Kamen. FIRST uses robotics and exciting sports-like competitions to help students develop the skills needed to compete in the technology-driven global economy. Maryland has more than 600 FIRST teams, from kindergarten through 12th grade, ages 6-18. FIRST programs use robotics as the vehicle to engage students in the hands-on, minds-on creative process of technological innovation. But there's much more to FIRST than the robots.



University of Maryland Baltimore County (UMBC)  
Operational Partner for FIRST LEGO League  
<http://www.umbc.edu>

UMBC is defined by makers, explorers, doers and dreamers. Whatever your passion, at UMBC you'll find a program to truly challenge and excite you, while working side by side with phenomenal professors, accomplished mentors, and leading researchers. Ours is an incredible and diverse community, but what makes it unique is the way everyone comes together to learn, solve problems, and just have fun. Because no matter who you are, we are all Retrievers.



Universities Space Research Association  
Operational Partner for FIRST Tech Challenge and FIRST LEGO League Jr.  
<http://www.usra.edu/>

Founded in 1969, under the auspices of the National Academy of Sciences at the request of the U.S. Government, the Universities Space Research Association (USRA) is a nonprofit corporation chartered to advance space-related science, technology and engineering. USRA operates scientific institutes and facilities, and conducts other major research and educational programs, under Federal funding. USRA engages the university community and employs in-house scientific leadership, innovative research and development, and project management expertise.

# Organize your shoot: The essentials

## Success doesn't happen by chance.

This section will cover the basics, with more details to come. Here are the two media strategies you will typically use:

1. You will work with the photos later and manually sort them.
  - a. Shot order doesn't matter
  - b. You will sort them yourself
2. You will do a presentation at the event.
  - a. Have photographers shoot only one area on each memory card
    - i. Just the pits
    - ii. Just the judging
    - iii. Etc.
  - b. When the photographers return, copy the photos into a folder for each area
    - i. Reformat the card
    - ii. Send photographers to their next assignment.
  - c. The goal is to have only shots from one area on a card for use throughout the day.

## Simple key points

The points below are all key issues to your success. Read them carefully and ignore them at your own risk.

1. Setting up the cameras
  - a. Sync all camera clocks for file re-naming and combining later.
    - i. Allows you to use the file naming process described below.
    - ii. Then all files from all cameras can be placed in a folder and they will sort in order shot.
  - b. Set to high ISO because most locations have bad lighting.
    - i. You should not use flashes.
    - ii. Instead set your camera to highest ISO that is not push setting (adds grain).
    - iii. This will allow you to shoot almost anywhere in the event regardless of lighting.
  - c. Set cameras to "No Flash Auto" if available.
  - d. Set white balance to auto on all cameras and camera modes.
    - i. A typical event has so many kinds of lighting you cannot use manual white balance.
    - ii. Auto white balance works very well on most cameras and favors recurring colors.
  - e. Set all cameras to the largest image size in JPG format.
    - i. You do not need raw format; turn it off << **IMPORTANT**
  - f. Set all cameras to the same color space: Preferably sRGB << **IMPORTANT**
  - g. Take some test shots to make sure exposures are correct
    - i. After you have set up the cameras go out on the floor of the event and shoot the same photo with every camera.
      1. Shoot a wide shot.
      2. Shoot a close-up of a person.
      3. Shoot an object.

- ii. Compare images and make adjustments as required.
  - h. Make sure you have readers for each type of card used in the cameras or proper cables.
    - i. Most cameras use SD Cards.
    - ii. Confirm with all participants what type of card their camera uses.
    - iii. Bring a multi-format card reader with you.
    - iv. Fully format all cards in the camera that will use them.
    - v. Instruct photographers NOT to edit or delete images on their cards << **IMPORTANT**
  - i. Make sure everyone knows how to pre-focus and hold focus on their cameras.
2. Photo composition
- a. All shots must be horizontal.
  - b. Shoot 90% of the full frame (see below).
  - c. Make sure you can see faces.
  - d. Look for intense work or cheerful faces.
  - e. Don't let kids mug for the camera (unless you are doing a fun shot).
  - f. Pay attention to the backgrounds (kids crashing the photos).
  - g. Look for key elements (logos, mascots).
  - h. Get environment shots (pits, rooms, halls, signs, hats).
  - i. Make sure people look good (no booger shots).
  - j. Watch your horizons (unless you are deliberately shooting at an angle).
  - k. Follow the 'rule of thirds' (see expansion below).
  - l. Avoid camera stares unless you are shooting a group straight on. *Note: A camera stare is when one or more students deliberately stare at the camera out of context.*
  - m. Don't don't don't don't overshoot. Look, frame, shoot. *You will not have the time to edit 10,000 photos. Try to get each shot once or twice and move on.*
  - n. Focus on focal points. Make sure you pre-focus on your subject.

## Shooting basics: Shoot at 90% full of full frame



Why? There are two reasons:

1. Video typically crops a 'safe area' off images when projected.
2. When people are shooting with multiple cameras you will typically have varying pixel dimensions and ratios. When using an auto-crop program to a common resolution you want to retain your subjects.

## Use good folder structures and file naming

Please see the two bonus articles for details:

- Bonus 5: *File Naming So You Can Find Your Work* on page 38
- Bonus 6: *Folder Naming and Versioning on page* on page 39

## Make sure you have reliable internet access

- This is critical.
- Request in advance, confirm, and test the night before.
- Be sure to test all protocols and applications.
- Remember that when crowds arrive, public wireless will jam up.
- If you need clear bandwidth for streaming video be sure request a private wireless network.

## Bring some key equipment

- Printer/scanner (check toner and/or ink levels)
- Some extra cables for various applications
- Paper, pens, tape and scissors
- DVD R/W, large capacity thumb drives
- Batteries



## Use file renaming software

We use a tool called "Better File Rename" (only for Windows 7/10)

<http://www.publicspace.net/windows/BetterFileRename/>

This lets you create predefined patterns called 'droplets.' You just drag a number of files on top of the droplet and say, "GO." I typically first use the "PrePendDatTakenTimeDate" droplet. Then the "PrependTEXT" droplet. Then a droplet that replaces all spaces with a hyphen for internet safe names.

Name	Date modified
Prepend TEXT.dpt	1/27/2017 3:43 PM
Prepend Web.dpt	10/18/2015 9:31 AM
PrependDash.dpt	6/22/2015 6:21 PM
PrePendDate.dpt	4/14/2015 7:45 AM
PrePendDateCreated.dpt	5/23/2015 3:48 PM
PrePendDateModified.dpt	4/6/2015 10:28 AM
PrePendDateTakenTimeDate.dpt	9/25/2016 6:10 AM
PrePendFRC3941.dpt	3/29/2015 10:18 AM
PrePendMDFTC.dpt	2/1/2015 6:52 AM

Example:

Original File	DSC_4581.jpg
Then Pre-Pend Date/Time Taken	2017-02-25-16-25 DSC_4581.jpg
Then Pre-Pend Text to Event	FLL-State-Pits 2017-02-25-16-25 DSC_4581.jpg
Then Replace Spaces with -	FLL-State-Pits-2017-02-25-16-25-DSC_4581.jpg

This can be done to hundreds of files at once. By using the date in ASCII order (Y/M/D) with full padding of number (01 instead of 1) the photos from multiple cameras can be put in order by event, section, date, and time, while retaining the original file number. It also makes it nearly impossible to have duplicate file names even if two cameras produce a file named "DSC\_4581.jpg." This is why the cameras must have synced date/time. It is important to keep the base file name, DSC\_4581.jpg, for future reference and searches.

## Learn how to Sort Photos

You have to sort quickly at an event. Please see the Bonus content on this process.

- *Bonus 7: Sorting and editing photos* on page 40

# Plan Your Event

## Event preparation

- **Local rules and guidelines for taking photos and videos.** Discuss with the tournament director and emcees.
- **Guidelines for taking photos and videos on the field.** Discuss with the emcee, head referee and judge advisor.
- **Consent for taking photos.** Confirm photo releases and posters when entering the venue. Find out if there are special restrictions.
- **Current technology.** If using action cams or quad copters be sure to review the facility for safe operation.

## Logistics

- Remember that you should not get in the way of the teams competing nor the volunteers working with them
- You should rarely get in the way of the audience members (don't camp out between the audience and the action)
- Safety first: Follow safety requirements for the event.

## Shoot planner

We developed this simple event shoot planner. If you are doing a video on-site for the day of you will need this. The goal is to produce a video five minutes or less in length. The attached spreadsheet lets you define each sequence of the video, how many shots or video clips, and how long they will appear. It then tallies the seconds and calculates the minutes.

Why is it important to plan your shoot? Planning makes it much easier to edit in a rush. If you get 400 practice photos back and you know you only need 72, you will have to brutally edit until you get there. If you plan ahead, you'll have fewer wasted shots.

You can access this document as a separate attachment with this download.

Event Shoot List Planner				
				Minutes
				4.95
SEGMENT	SHOTS	Secs/Per	SECONDS	Notes
Opening	1	22	22	Star Wars Video
Pits	80	0.4	32	1-2 Per Team
Pits Video	1	20	20	3-5 Short clips
Practice	72	0.4	28.8	1 Per Team
Practice Video	1	20	20	2-4 short clips
Judging	72	0.4	28.8	Good coverage from all three judging areas
Judging Video	1	16	16	Interview in halls. Excited kids
JrFLL	40	0.4	16	General Shots
JrFLL Video	1	15	15	2-5 Short clips plus drone flyover
Opening Ceremony	50	0.4	20	Plus drone footage.
Volunteers	40	0.4	16	General Shots
Games	144	0.4	57.6	Apx two per team.
Closing Slides	10	0.5	5	Apx two per team.
<b>END OF SHOOT FOR VIDEO: Following shots used in Post Production</b>				
Closing Ceremony			100	Lots of crowds and kids on floor. Group shots of each winning team.
Detail Shots			100	Small details, signs, designs, etc.
Award Winning Groups				Tight group shots after receiving trophy.

# Specific Shot Instructions

## STEM-specific principles

### Keep it steady

If you have shaky hands, or will be shooting from the same position, or while crouching/stooping/etc. (i.e. the run in and high-five) use a monopod or tripod to ensure your shots are steady. Camera shake ruins all photos.

### Get on the students' level

When shooting, try to get some shots from students' perspective by lowering the camera to their height, as opposed to always shooting down on them. In general think students, their line of site, their views. You will be sore at the end of the day, but it will be worth it.

### Shoot down

If possible, take your longest zoom, go to the top of the arena and shoot down onto the field. This works for all levels of FIRST and usually makes for some interesting shots that can be used for titles.

### Turn off flash

Flashes can seriously hamper FLL, FTC, and FRC robots and are generally a distraction for teams. Just shoot high-ISO and do not use flashes.

## High-speed line shooting: High-fives, trophies, and run-ins

1. When shooting high fives, stand at the end of the line, pick a spot ~3/4 down the line and shoot in, toward that spot, at a 45° angle each time a kid passes. This avoids getting in the shot the shoulders of the students who've already passed, while still giving you several students high-fiving in each shot.
2. Focus on The Goal: When shooting the run-in with fog machines. Pick a spot to shoot from, have someone stand where the students will be emerging from (usually right after the fog machines) and focus your camera on them. Then turn off autofocus and stay at that position.

## Field Shooting

### Sequence instructions

With each match being 2.5 minutes in all three timed programs, you have to move quickly to cover each match. This is the suggested sequence for all events.

1. Get the entire field or pair of tables.
2. Get a closer shot of each team.
3. Get a shot of the refs.
4. Grab a shot of each bot.
5. When the match starts, get a shot of each team driving or directly.
6. Then get shots of the robots doing their tasks.
7. Next, look to the other team members either behind or on the side.
8. Get shots of the refs scoring and interacting with students.

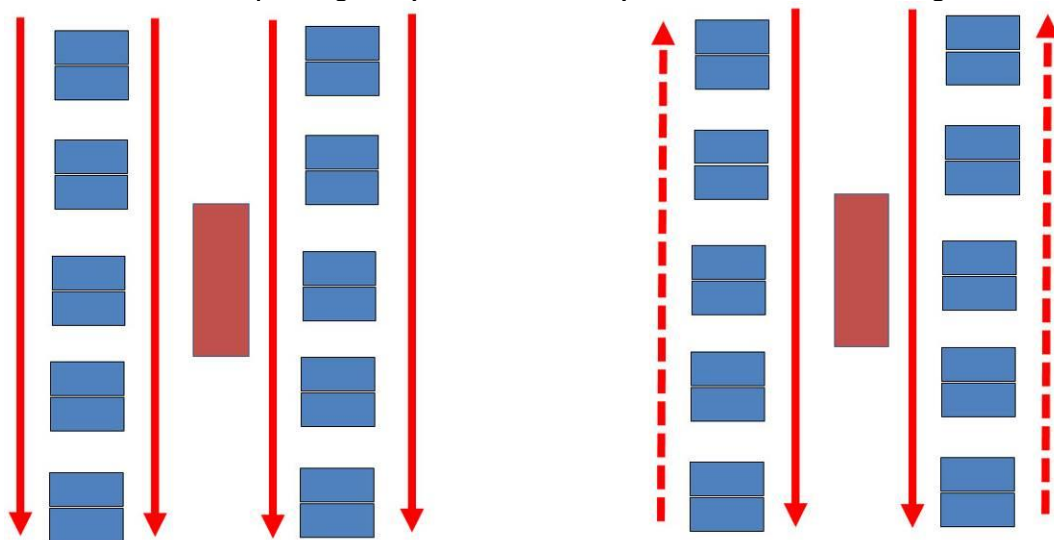
You can do this in 2.5 minutes if you practice.

## Specific situations

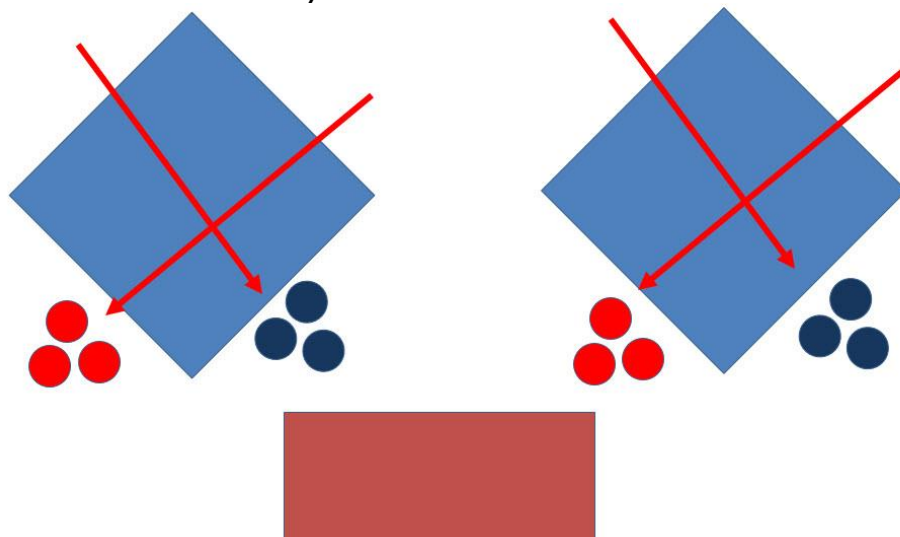
### Working a big floor (particularly *FIRST LEGO* League)

When you have a large tournament (like FLL State Championships) and limited photogs you have to move fast. Typically, with four photogs we assign one to each end of the table and they work their way down during the match, getting as many of the shots listed above as possible.

**FLL, FTC and FRC with two and four photogs.** With four they work their way down throughout the 2.5 minutes. With two photogs they work their way down the inside and get as far as possible on the outside.



With FTC you want to be low on the floor opposite the teams. With four photogs you can cover all the fields. With one or two you need to shoot and move.



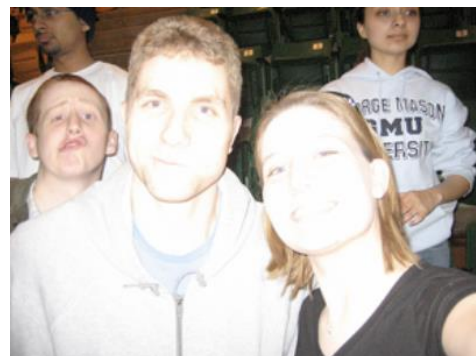
FRC is highly dependent on the event venue. Bottom line, you cannot obstruct the judges, refs, or teams, or the audience.

## Comments on using a flash at events

### When not to use a flash

Generally flash photography is not effective at large events for the following reasons:

1. Flashes should not be used in any competitive areas including challenge fields and judges' rooms because of the distraction it causes for the students.
2. Flashes can cause sensors to fail. Therefore, as noted above, flashes should not be used around the robots.
3. Generally the flashes mounted on cameras will not produce nicely lit photos.
4. Even the largest flashes do not have the power to cover a large room which can create very unpleasant photographs with overexposed subjects and dark backgrounds.

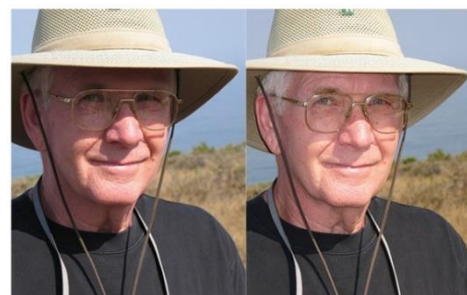


### When a flash can work

1. Bouncing light for overall coverage: If you have a high-power flash you can point it at the ceiling in a typical classroom. This will generally provide nice light across the entire subject.
2. Using fill flash: Often the lighting in the competition facilities is top down commercial fixtures. This causes a lot of shadows and some unpleasant skin tones. Using a flash on very low power will highlight the subject nicely.

You will need to read your camera or flash manual carefully and experiment to get the best results.

**Remember: The goal is to create spontaneous, natural looking photos.**



by Mike Baird



# All the shots

The next few pages show the standard range of shots with sample composition. Remember, everyone wants to see his/her child.

This is a compiled list of important photos for all four programs. Not all will apply, but most will. Please review carefully and confirm with your event coordinator.

## General shots

- FLLJr Expo volunteers
- FIRST Stop table and staffing
- Group of scorekeepers
- Queuers
- Pit Admin
- Practice Table
- Welcome Table
- Volunteer check in

## Refs

- Groups of key volunteer organizations
- Refs in action at tables, fields, and with teams.

## Special required (check with event coordinator)

Typically must have date/time stamps on the pictures for govt agencies and volunteers

- Look for displays from armed services
- Displays from other government organizations
- Any VIP photos

## Volunteers

- Groups of volunteers - pit admin, spare parts, inspectors, machine shop (if available onsite), FIRST Stop Welcome table, Volunteers Registration table, Safety Glasses, Practice Field, Refs, Queuers, Re-setters, Scoring table, judges, special volunteers.
- Small group shots of volunteers in action - 1 or 2 in shot
- Volunteer Coordinator
- Event manager
- Dancing volunteers
- Judges interviewing team members in the pits, sitting as a group watching games, as a full group during opening or closing ceremonies
- FIRST Stop welcome table volunteers interacting with visitors
- Inspectors working with teams
- FTA, Field Supervisor, Scorekeeper, Emcee, Game Announcer
- Opening ceremonies - drum line, anthem singers,
- Groups of volunteers - Welcome table, Safety Glasses, Refs & MC's, Queuers, Field Reset, Scoring table & GA, student Ambassadors, FTAs, CSAs, FTAAs,
- Small group shots of volunteers in action - 1 or 2 in shot.
- Teams in pits
- Host staff from event location.

## FRC, FTC, FLL & FLLr

- A few shots of robots on field and teams in control station (not as important)
- Closing ceremonies/awards
- MOST IMPORTANT - all volunteer group shot on field right after closing ceremonies

## Teams

- Robot action on field
- At least one shot of each team in pit and each robot
- Reaction of match winners (esp. in playoffs)
- Team mentors and students working together
- Drivers and coaches during matches
- Team mascots
- Mentor parade (if there is one)
- Award recipients
- Teams interacting with each other
- Scouts working in the stands

## General

- Stands - but only if filled
- Overview of pit area
- Technology Row, ind. shot of each table
- Scholarship row, ind. shot of each table
- Overview shots of each room being utilized
- Outside shot of venue
- Opening and closing speakers
- Student chorus during opening on Day 1 and Day 2 for districts and Fri and Sat for Championship
- Student Ambassador Training at FIRST Stop table and on tours

## Venue

- Get pictures of the venue: Name in the arena, signage outside the building, signage at the entry on the road in, banners for the venue
- Get the non-event staff as well (food services, security, etc.)

# Brief notes on shooting video

All the suggestions for photographs apply to video.

Here are some specific guidelines for video:

1. Know how to work your equipment.
2. About SD cards (and other cards)
  - a. Always reformat your SD card in the camera before starting a shoot. Why? It makes sure the card has no alternate formatting or files and it will error check the card for proper recording.
  - b. Make sure you have the right speed card. There are a dozen or so standards. Read the manual and make sure you have the proper card. Why? If you don't the recording may fail.
3. Check for proper exposures (though most video cameras will do a good job at this).
  - a. If you have options for white balance, try some settings.
  - b. Or manually adjust.
  - c. But auto should work well in most settings.
4. Set your focus mode: Scene, face, etc.
  - a. If you have options, try the various settings.
  - b. Start with 'focusing on faces'
5. Composition follows the same rules as still photography.
  - a. Shoot horizontal (even with phones)
  - b. Pull back to about 90% of frame (see photography note above)
  - c. Follow rule of thirds.
  - d. Generally, keep the camera still.
    - i. Use a tripod or mono pod
    - ii. If you have to do live follow, then find an inexpensive stabilizer. Here are two examples:  
[http://www.cowboystudio.com/product\\_p/rl-00iset-tophandle.htm](http://www.cowboystudio.com/product_p/rl-00iset-tophandle.htm)  
[http://www.cowboystudio.com/product\\_p/stabilizer.htm](http://www.cowboystudio.com/product_p/stabilizer.htm)
  - e. Note that zooming, rotating, coloring, and cropping post shoot all significantly increase rendering time.
6. Leave intro and outro time.
  - a. If possible, give yourself 5-8 seconds of footage at the beginning and ending of the content.
  - b. Why? This gives you space to edit and transition in/out without covering content.
7. Find a best audio solution.
  - a. These are events are LOUD.
  - b. For general action video the on-camera mic will be fine.
  - c. For in-event interviews you will need hand held mics and a mixer.
  - d. See this article for more details: <https://techbrick.com/fundraising-marketing/42-techbrick-tv>
8. Don't be the vacation guy from years past. EDIT EDIT EDIT.
  - a. Don't post raw video. No one wants to see it all.
  - b. Edit it to reasonable lengths. Typically < 4 minutes.
  - c. Include a title and other identifying information.
9. Post it on YouTube and Facebook.
  - a. Create good titles.
  - b. Tag and keyword well.

## Planning a 'day of event' video

On the next page are links to many of the 'day of' videos we've produced. They are fun and serve as a great way to close out the day with a quick review of the entire event.

Here are some key points to consider.

1. **LENGTH:** Total length for the video should not exceed 5 minutes. 4 is better.
2. **PLANNING:** Use the provide spreadsheet to plan exactly how many images or seconds of video will be required for each section.
3. **SOFTWARE:** Make SURE you know how to work all your software and that you have tested on the equipment you are using that day. That includes primary video editing, photo cropping, DVD burning, music, etc. **DO NOT WAIT TO THE DAY OF EVENT TO INSTALL OR LEARN SOFTWARE.**
4. **LOGISTICS:** Find out exactly how they intend to show your final video. Will be on Blu-Ray, DVD, MP4 file, etc. Do a short test early in the day to make sure there are no incompatibilities. For example, DVD output will crop the image to the 'safe areas' of television video. MP4 will be full frame, etc.
5. **PRE-PRODUCTION:** Do as much pre-production as possible. Titles, counts, intros, etc. See our samples on the next page. Test render them.
6. **WORK THROUGHOUT THE DAY:** This is why you have the photogs shoot in sections. Get the pits shots early, do that section of the video, get the projects next, do that set. Get spectator shots, do that. Get volunteer shots, do that section, get the first round of the games, do that. Then render.
7. **A MAN'S GOT TO KNOW HIS LIMITATIONS:** Be sure to test render a sample presentation of nearly the same length. You should allow yourself a time buffer before the closing ceremony in case you have to re-render.

# Sharing your work

After you have done your amazing job of recording your event you should share it with the world.

There is only one way to do this easily: Google

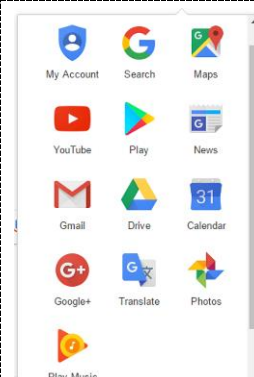
Why? Google offers an astounding array of free services. The one listed to right is only a subset.

You will primarily use:

- Your main account
- Gmail for account management
- YouTube for videos
- Photos for albums
- Drive for storage

You may want to use:

- Calendar for scheduling
- Maps for location information



We are only providing the steps. Instructions for each of these are readily available on the web in Google's help files and YouTube

1. Create a Gmail address for your team or organization.
  - a. Examples: frc3941@gmail.com, [smithvillefl@gmail.com](mailto:smithvillefl@gmail.com)
  - b. Use this for all google management.
2. Initialize your YouTube account
  - a. Set it up as an organization
  - b. Add header graphics
  - c. Complete basic Google+ information
  - d. Confirm it for extended videos
  - e. Practice uploading and getting share and embed codes.
3. Initialize Google Drive
  - a. Create appropriate folders and shares
  - b. Check size. There is plenty of free space, more space is \$2 per month and more.
4. Initialize Google Photos
  - a. Practice uploading and creating albums.
  - b. You can share or embed albums in your website for Facebook.

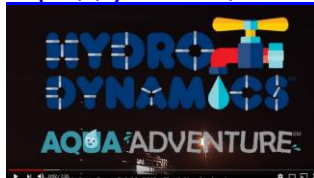
Why use YouTube and Photos instead of Facebook? Google creates an independent location for your media and will display on almost any device in existence. You will have total control over your videos and images and share them anywhere you want to and with whom you want to. Facebook readily displays links to YouTube and Google Photos albums.



## Sample event videos

Over the years we have produce event summary videos for multiple competitions. Many were assembled throughout the day and shown at the final ceremony (no pressure!) Hopefully you will get some ideas from these samples.

<https://youtu.be/9ktLRI53k7w>



<https://youtu.be/5786LQzz20M>



<https://youtu.be/nxZdtWVou9U>



<https://youtu.be/K8xkFo8Sk30>



<https://youtu.be/4tNcge6sNUo>



<https://youtu.be/EGauCLrxsZE>



<https://youtu.be/3bAUJOmytC0>



<https://youtu.be/KgC5UmhpLD8>



<https://youtu.be/ZDFsviMJENc>



## Sample photos

The photos below are provided to demonstrate good composition and content for our events. Review them and replicate them.

### At the tables/fields

The goal here is faces and emotions. Success and failure. Team enthusiasm and frustration.

The “At the Table/Fields Shot” Running the Bot



The “At the Table Shot” Prepping the Bot



The “At the Table Shot” Scoring the Team



The “At the Table Shot” Team on Sidelines





## Project/interview shots

The goal here is to show the serious work these students have done. Capture their expressions and intensity. Make sure you share their project elements and robots.

### Group Presentation



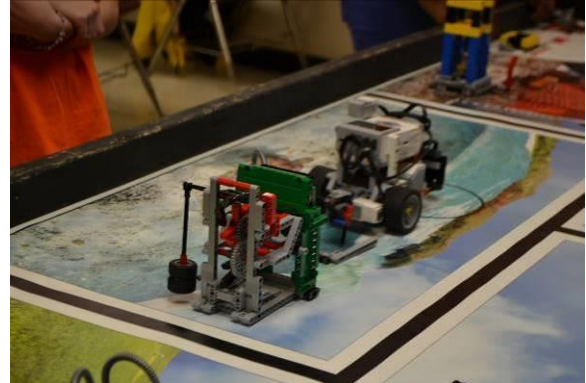
### Team Poses



### Prepping in Hall



### Shooting the Bots: Get Close



### Close-up of Presenter



## Shooting the pits

The goal here is teamwork and fun. Get the teams together in the pits for fun shots. Get close-ups of the kids intensely preparing their programs and bots. Get interactions with the coaches. Capture their displays and project presentations.

### Team shots



### Detail close-up





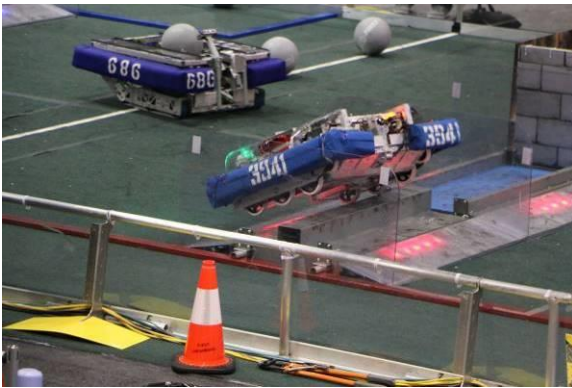
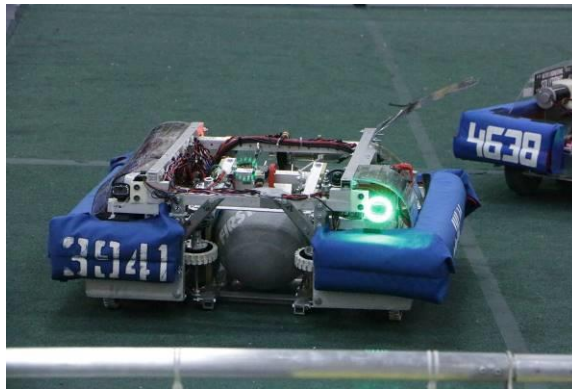
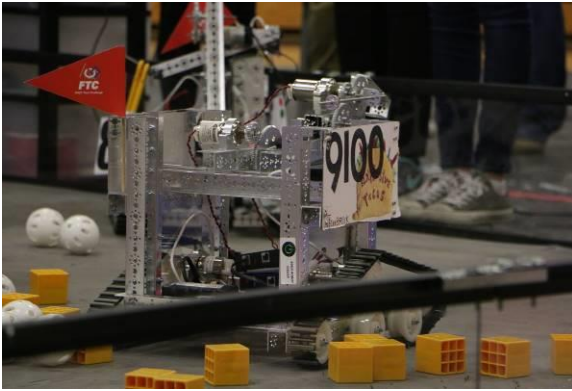
## Individual students





## Shooting the bots

Get tight. Feature the bot.



## Run-in/entrance/introduction photos

The goal here is action. Get each team running in, get expressions in the stands. Be sure to get students and spectators.

### Entry run (pre-focus shot)



### Kids and parents on sidelines



## Alliance selection





## Awards

The goal here is to capture the rewards of hard work. Team photos move fast but make sure each student looks good. Look for great expressions in the high-five section. Get volunteers.

Judges: get lots of judge pictures



Team shots after awards



High fives: stay tight, get expressions



## Full area

Like other areas of the event be sure to show the full scope of the presentation space.



## Judges and volunteers



## FIRST LEGO League Jr.

The goal here is to capture the excitement of these young engineers.

### Team picture with displays

Get team pics with their displays in the background. They will and should be expressive, but not ugly (pulled up noses, stretched eyes etc.)





## Explaining projects

Get low and ask them to explain their projects. Get shots of their response.



## Bonus 1: Software resources

FUNCTION	PRODUCT	COMMENTS
File Renaming	I use a tool called "Better File Rename" <a href="http://www.publicspace.net/windows/BetterFileRename">http://www.publicspace.net/windows/BetterFileRename</a>	As discussed above this great utility lets you bulk rename files and append or replace a wide range of information. The droplet allows for the creation of pre-defined conversions. At \$19.95 US it is a deal.
File Conversion	Movavi Video Suite <a href="https://www.movavi.com/suite/">https://www.movavi.com/suite/</a> <a href="https://www.movavi.com/store.html">https://www.movavi.com/store.html</a>	<p>This suite will convert audio, video, and still images to almost any size or format. It is fast, and easy to use. It also burns CD/DVD formats, has a basic video editor, and crazy range of other features.</p> <p>This is an essential tool for media production because when you have images from many cameras the pixel dimensions will vary. This tool will allow you for example to crop all images to 1920x1080 for HD video production. You can download a 30-day demo. But at \$60.00 US for a personal license it a great buy.</p>
Video Production	Adobe Premier Elements/Photoshop Elements <a href="http://www.adobe.com/products/photoshop-premiere-elements.html">http://www.adobe.com/products/photoshop-premiere-elements.html</a>	There are many consumer-friendly video editing programs. If you already are comfortable with one, then use it. Otherwise buy the Adobe Elements Suite. For \$99.00 US (Win or Mac) you can't beat it. Photoshop Elements is user-friendly and has tons of special effects. Premier Elements has a basic and advanced mode. Both are easy to use. Also, Premier Elements exports to a wide range of formats and lets you create DVD menus in the program.
Tutorials	YouTube <a href="http://www.youtube.com">http://www.youtube.com</a>  LYNDA <a href="http://www.lynda.com">http://www.lynda.com</a>	Beyond the tutorials and documentation provided by the software companies, you can find almost anything for free on YouTube. For advanced tutorials in a great format subscribe to LYNDA.
Music	Sonic Fire Pro <a href="http://www.smartsound.com/sonicfire/">http://www.smartsound.com/sonicfire/</a>	Good music is key to your presentation. Your first concern is to use music legally. It must be either licensed or clearly public domain. There are many sites on the web that provide music and sound effects. We use Sonic Fire Pro. There is a free trial, but at \$70 US for the license it is the best tool. You also have to buy tracks (albums or individual tracks). It allows you to render custom soundtracks to exact lengths in a variety of moods and tempos. Note that sometime YouTube will flag your music as copyrighted. You have to contest this and document the track source.

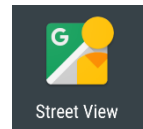
## Bonus 2: Create 360-degree photospheres

These types of photos are very informative and fairly easy to make. After years of doing this my photospheres have been viewed millions of times. You can see them here: <https://enktesis.com/innovative-projects/photospheres>

and here: <https://www.google.com/maps/contrib/113541788084055653910/photos>

### Using the Google app

A few years ago Google released an app that lets you take as many as fourteen photos with your phone and then stitch them into a spherical image that can be viewed online or in virtual goggles like the nearly free, Google Cardboard. Now you use the Street View app.



How do you do this? Use the Google Street View App available for free for IOS and Android.

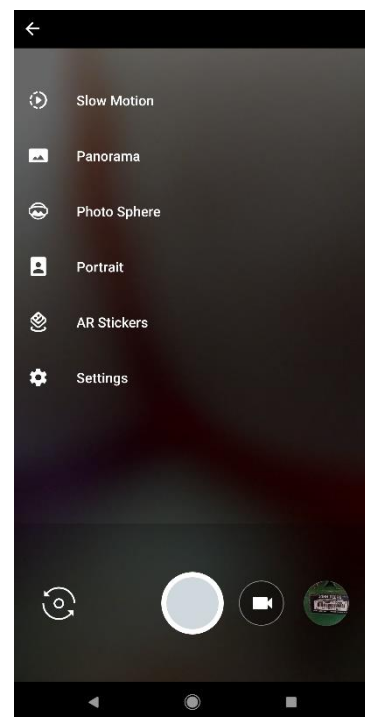


You choose the app, then the Camera icon, the Camera, then you follow the dot on the screen taking one shot a time until you covered them all. After this it will stitch it together. Or, do this from the Google Maps App. Or, the new Google Pixel phones have it as a photo option.



The key points are as follows:

- Be at least 5-8 feet from near objects.
- Shoot vertical.
- Make your first shot your primary subject.
- Move then stop on the dot.
- Work your way around at eye level.
- Then shoot the upper layers.
- Then the top (typically three dots)
- Then move to below middle.
- Then the bottom.
- Don't worry, it will remove your feet.



You will end up with an image that looks like this:

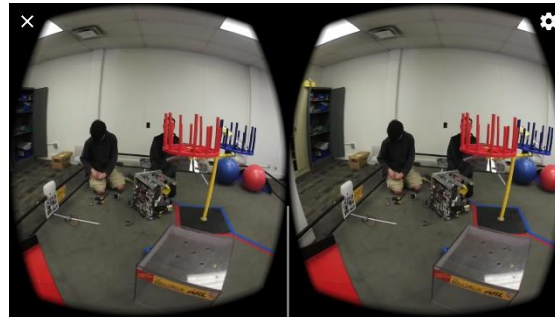
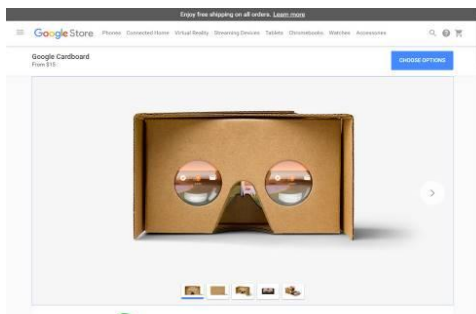


When viewed on the web or in a viewer it will rendered in 3d and you can browse around it.





Buy Google Cardboard: [https://store.google.com/product/google\\_cardboard](https://store.google.com/product/google_cardboard)



When you load the cardboard app or view immersive images or video on your phone you can put the phone in the Cardboard device and see it in immersive space. It is amazing.

## Using a dedicated spherical camera

Several companies now offer dedicated spherical cameras.

Since this market changes so quickly the best way to get information is to search on Google for “best 360 degree cameras.”

<https://www.google.com/search?q=best+360+degree+cameras>

There are some broad categories to consider:

- Low end (<\$200)
- Middle range (\$200-500)
- High range (\$500-\$1500)
- Pro Range (\$1500-\$100,000+)

I use the Ricoh Theta series: <https://theta360.com>

Why? They are affordable. The latest version has very high-quality video. And the form factor is compact and unobtrusive. Most of the time people at a site don't even know it is a camera.



**You need to create a complete kit with the following items:**

1. **A vertical mono-pod.** I use the Smatree Q3. The camera will see a standard tripod. These are nearly invisible to the camera.  
<https://www.amazon.com/gp/product/B00XN1P9QI>
2. **A small external battery.** I use the Anker Astro E1 5200mAh. This is compact and comes in a storage bag that can be hung on the monopod.  
<https://www.amazon.com/gp/product/B00P7N0320>
3. **Water Resistant House (not for underwater):** I use the HOLACA Case for Ricoh Theta. For general protection in adverse weather.  
<https://www.amazon.com/gp/product/B01LAK4T78>
4. **A hard case:** I use the Theta case from Caseling. This is essential to protect the lenses and the camera should be in the case at all times.  
<https://www.amazon.com/gp/product/B01JGR01BA>

## General photosphere techniques

1. **Know which is the 'front' of the camera.** This is the side that will appear in the center of the final image. You will want to point this side to your main subject.
2. **Remember the camera sees everything.** Be careful to observe what it will see and adjust accordingly.
3. **Bright sunlit days do not work well for external shots.** Because the camera sees a sphere, bright sun will make the exposures unacceptably dark or light (usually dark). Try to shoot outdoor shots in pre-sunrise mornings, late afternoons, or bright, overcast days.
4. **Bright windows will make indoor shots unacceptable.** Again, you don't have the spot control you have with a DSLR.
5. **Learn where to position your camera for subject material.** If you put your camera, for example, in the middle of a large park everything will look very small. You want to camera's primary subject to be close. You just have to experiment.
6. **Get out of your pictures.** This is very hard. I have hidden behind posts, cars, doors, tables, etc. Use the app or self-timer or app and either pose inconspicuously or hide.
7. **You will rarely get to use the monopod by itself except indoors.** Most of us put the monopod all the way up, then hold it right at our noses. This puts us straight down in the photo but since you can't see the camera, we look like a bystander.
8. **Shoot each scene at least 2 or 3 times.** This ensures you'll get one perfect image.
9. **Wait after your camera's tone.** Even though the camera 'beeps' it may not be done stitching. Wait at least 5 seconds before moving the camera.

## Advanced photosphere techniques

You need to be careful with these images. They cannot be edited like other images. **The best software for general manipulation is PT GUI.** <https://www.ptgui.com>

YouTube guidance for video: <https://support.google.com/youtube/answer/6178631>

Google guidance: <https://support.google.com/maps/answer/7011737>

## Bonus 3: Learn from great photographers

The best way to improve your photography is to study great photographs. On the next two pages are great resources.

### **Justin Kase Conder**

With the breadth and depth of knowledge acquired photographing in 42 different countries around the world and the humility of having grown up in a single wide mobile in hot and dusty Central California; whether visiting with a Ghanaian village chief or the former CEO of the world's most recognized brand, Justin's sincere curiosity and down to earth nature allow him to connect with everyone. His creativity, attention to detail, and diligent work ethic have provided a leg up to each of his clients throughout his professional career.

### **Tony & Chelsea Northrup**

Award-winning author & photographer Tony Northrup, and his wife, Chelsea, have published more than 30 educational books. As a photographer, their work has been published worldwide.

## Online Resources

Time Life: The Most Influential Images of All Time:

<http://100photos.time.com>

CNN: 25 of the most iconic photographs:

<https://www.cnn.com/2013/09/01/world/gallery/iconic-images/index.html>


Lots of Articles at Google:


<https://www.google.com/search?q=greatest+photographs+of+all+time>

## Justin Kase Conder: Great Images

**\*enktêsis**  
\* building value  
developing ideas

a world of experience in technology and marketing





Justin Kase Conder



**The value of the still image comes from the fact that it's timeless. It allows the viewer the opportunity to study and react to the content of the image in a unique way. A still image preserves a moment in time, a sliver of something that continues with no ability to stop it. It preserves it in a medium that is understood by anyone with the ability to view it.**

**Justin Kase Conder:  
International Photographer**

74

**enktesis.com**

Copyright 2017 Enktesis LLC. Not for Distribution.

Please learn more about Justin's work.

<https://jkase.com>

<https://www.instagram.com/jkasephoto>

I met Justin when he was hired to photograph our family for an article in a magazine. We maintained a friendship over the years and I've followed his adventures as he traveled the globe covering almost every country in the world. His work is amazing, and I suggest you peruse his site and ask, for each picture, what makes this a moving, compelling, emotional image.

**ABOUT JUSTIN:** With the breadth and depth of knowledge acquired photographing in 42 different countries around the world and the humility of having grown up in a single wide mobile in hot and dusty Central California; whether visiting with a Ghanaian village chief or the former CEO of the world's most recognized brand, Justin's sincere curiosity and down to earth nature allow him to connect with everyone. His creativity, attention to detail, and diligent work ethic have provided a leg up to each of his clients throughout his professional career.





## Tony & Chelsea Northrup



This couple provides the best instructive materials you can find.

We strongly suggest you visit their site:

<https://northrup.photo>

And order their book: "How to Create Stunning Digital Photography"

<https://northrup.photo/product/stunning-digital-photography/>

And all their books

<https://northrup.photo/shop/>

And their YouTube Channel:

<https://www.youtube.com/user/VistaClues>



Award-winning author & photographer Tony Northrup has published more than 30 educational books. Among other titles, Tony is author of Stunning Digital Photography and Windows 8 Inside Out. As a photographer, Tony's work has been

published worldwide on magazine, book, and CD covers, and everywhere from Velveeta to Viagra ads. Tony lives in Waterford, CT with his wife (that gal in the next block over), daughter, and two dogs. Tony uses the Canon 5DS-R for most of his professional work. When he's shooting just for fun, he usually uses the Sony a7 II or just his Samsung S5 smartphone.



Professional photographer, Chelsea Northrup, started photography in high school using film cameras, and went on to study film photography at Connecticut College. Her work as both a photographer and model has been

published world-wide in just about every digital and print format, including book, magazine, and CD covers. When she's not working, she enjoys abstract, travel, and night photography. Chelsea co-hosts their YouTube channel, runs the publisher Mason Press, and is the project editor for the team's complete series of video books. Chelsea uses the Nikon D810 for most of her shooting, whether working professionally or just having fun.

# Bonus 4: Don't forget start and end of season photos

Each year, for most programs, you have a period of research and preparation and the a post season period of follow-up and wind down. There are plenty of images you should capture. Here are some tips. The same guidelines described above apply.

## Pre-Season: From first meeting to first competition

- Initial meetings
- Sorting parts
- Brainstorming sessions
- Outreach and community service
- Early team photo and individual photos of team and mentors
- Facility photos (rooms, tools, supplies, etc.)
- Robot build progress.
- Meals and special events
- Travel shots to and from events

## Post-Season: From last competition until the next season

- Debrief sessions.
- Sorting and cleaning.
- Final robot shots (if you are breaking it down)
- Outreach and community service
- Awards received
- Grouping of students into sub-teams
- Final group shot

# Bonus 5: File Naming So You Can Find Your Work

More great articles can be found in the free document “Mundane and Boring Subjects that Will Change Your Digital World” available at <https://enktesis.com/digital-world-doc>

What could be more boring than a discussion about naming files? What could be more frustrating than looking for a critical file that you randomly named “The memo I wrote on tues.doc”? There must be a better way. Ready? Follow these simple rules and you’ll save at least 125.87 hours next year.

## **RULE 0: Make sure Windows is set to ‘Show Extensions for Known File Types.’**

Why? *For some reason known only to Bill Gates the default is not show extensions. Extensions tell the computer which program to use to open the file. This is very difficult, especially when downloading and uploading. In addition, some programs show the extensions anyway which is confusing. So open a file window and go to “Tools > Folder Options > View (tab) > and uncheck the option for “Hide Extensions for Known File Types.” Click OK.*

## **RULE 1: Don’t Use Spaces or Special Characters in File Names. Instead Use dashes.**

Why? *You should only use A-Z, a-z, 0-9, and - in file names along with a . because:*

- \* *If you use them on the web or a network share they will link properly without special characters being added to the name.*
- \* *The file name will work on any computer or operating system.*
- \* *If you can avoid using underscores you should. Why? When linking the files the underscore gets lost in the hyperlink.*
- \* *I avoid underscores now because they disappear when hyperlinked.*

## **RULE 2: Make all file names begin with a class or client name in all caps.**

Examples: SYNE (for synergetic), USDC (for Union Station DC) or FORM (for a form) or MEMO (for a memo). Why caps? *Because all your files will sort correctly, and it visually delineates the client or function from the rest of the name.*

## **RULE 3: Continue the file name with a short but clear description.**

Example: SYNE\_ResourceGuideAd... Why? *Because you want to easily find the file by name when you go looking for it.*

## **RULE 4: Continue the file name with the date in computer sort order.**

Example: SYNE\_ResourceGuideAd\_090501... Why? *Because by putting it in Year/Month/Day format it will sort correctly. And, equally as important, it places a date in the file name since the system level creation and modification dates may change, particularly if a file is backed up or restored.*

## **RULE 5: Continue the file name with a version if necessary.**

Example: SYNE\_ResourceGuideAd\_090501\_v01... Why? *Notice we used 01 instead of 1 so it will sort correctly up to 99 versions (instead of 1, 11, 2, 12). Many of you create numerous drafts of your documents. This keeps them sorted in correct order by date and version in your file window.*

## **RULE 6: Make sure the file has the correct extension.**

Example: SYNE\_ResourceGuideAd\_090501\_v01.doc Why? *By showing extensions you have to enter it yourself. This is particularly important for the new Microsoft office documents which now have new extensions (docx instead of doc).*

## **If you follow these rules you should end up with:**

```
SYNE-ResourceGuideAd-090501-v01.doc
SYNE-ResourceGuideAd-090501-v02.doc
SYNE-ResourceGuideAd-090502-v01.doc
```

## Bonus 6: Folder Naming and Versioning

More great articles can be found in the free document “Mundane and Boring Subjects that Will Change Your Digital World” available at <https://enktesis.com/digital-world-doc>

What could be more boring than a discussion about naming folders? What could be more frustrating than looking for a critical folder among dozens of folders named “New Folder?” There must be a better way. Ready? Follow these simple rules and you’ll save at least 142.31 hours next year.

### RULE 1: Don’t Use Special Characters In Folder Names

*You should only use A-Z, a-z, 0-9, and - and a space in folder names. Why? The folder name will work on any computer or operating system. I don’t use underscores anymore because they disappear in hyperlinks.*

### RULE 2: Like files, start folder names with a client or function.

Examples: SYNE (for synergetic), USDC (for Union Station DC) or FORM (for a form) or MEMO (for a memo). Why caps? *Because all your files will sort correctly, and it visually delineates the client or function from the rest of the name.*

### RULE 3: Continue the folder name with the date in computer sort order, YYYYMMDD.

Example: SYNE 090501... Why? *Because by putting it in Year/Month/Day format it will sort correctly. And, equally as important, it places a date in the folder name since the system level creation and modification dates may change, particularly if a file is backed up or restored.*

### RULE 4: Continue the folder name with a short but clear description.

Example: SYNE 090501 Resource Guide Ad... Why? *Because you want to easily find the folder by name when you go looking for it.*

### RULE 5: In each project folder create folder named \_OldVersions

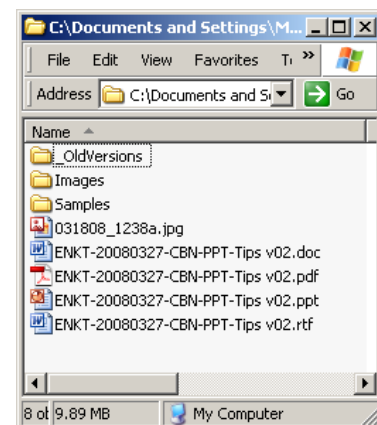
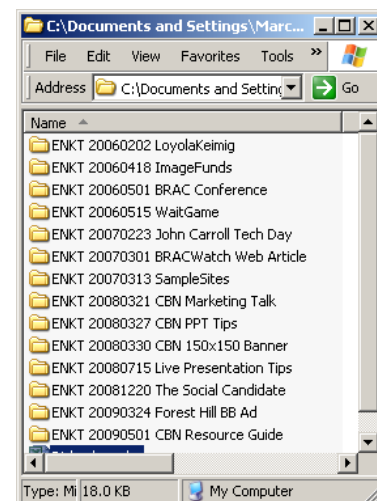
Why? *It is good to keep only active files in your primary folder. This makes it difficult to accidentally open an older file which can, of course, cause problems. As you make newer versions drag the old ones into the \_OldVersions folder. Why does it start with a \_? That way it will always stay at the top of the file list. I also suggest you create zip archives for old versions to further distinguish between the active and previous versions.*

### RULES 6-7: NEVER, UNLESS ABSOLUTELY NECESSARY, OPEN A FILE FROM THE MOST RECENTLY USED FILE LIST.

Why? *Many times list is outdated or may point to an older version. Always save to a specific folder and open files from a specific folder. If you do use the MRU list, immediately ‘Save As’ to a specific location.*

### RULES 8-9: NEVER EDIT OR WORK ON A FILE DIRECTLY FROM AN EMAIL ATTACHMENT.

Why? *If you receive a critical file, make sure you download or save it locally before editing. If you do not do this you may (and probably will, lose your changes in a very hard to find temporary folder that automatically clears files.*



## Bonus 7: Sorting and editing photos

More great articles can be found in the free document “Mundane and Boring Subjects that Will Change Your Digital World” available at <https://enktesis.com/digital-world-doc>

### FROM 36 EXPOSURES TO 3600: HOW TO SORT DIGITAL PHOTOS

By Marco Ciavolino, Enktesis, LLC, marco@enktesis.com, 410-838-8264

In the old days when a 35mm roll was 24 or 36 exposures most folks were relatively careful about how they took pictures. Processing and printing was/is expensive and most people couldn't justify spending hundreds of dollars on processing for a simple event (but many still did!)

In the age of digital photography anyone can shoot hundreds or thousands of images at even a relatively insignificant event. A basic digital SLR can shoot more than 15,000 images with a high-capacity HD card.

- The good news is that if you shoot 1000 pictures, you're bound to get at least one good one.
- The bad news is that if you shoot 1000 pictures, you're bound to get mostly bad ones.

How should you sort your photos? Here's a simple, practical process for doing so.

1. Be diligent about getting photos off your camera after each event.
2. Put them in a consistent folder structure like: “Photos 200707104 July Fourth”  
*Why? The folder will sort correctly in your file windows.*
3. In that folder create a folder named “Source” into which you put all the photos from your camera.
4. Then copy the entire folder and name it “HI” for High Resolution Versions  
ALWAYS keep a copy of your source files since most photo editing is destructive and physically changes the file.
5. Use the Windows “Picture and Fax Viewer” or similar tool to review the photos
  - a. If you right click on any image in the folder and choose “open with” you should find it.
  - b. If not, use your default image viewer.
6. Now begin your sorting process << IMPORTANT POINT
  - a. >> Pass One: Delete anything that is remotely bad no matter how endearing: Out of focus, bad lighting, unattractive/unflattering, no composition, food in mouth, eyes closed, crooked, etc.
  - b. Pass Two: Pick the best of sets of photos: In digital photography you will typically overshoot. Keep only the best two or three photos from each set or setting.
  - c. Pass Three: Pick the best of each set. Focus on what tells the story of the event.
  - d. If you've done this well, you should end up with 20% to 30% of the photos remaining.
  - e. Now pick the best photos from the set and only show those.
7. Then copy the “HI” folder and name it “LO”  
Use your image editing program to ‘down sample’ all the images to a width of 1024 by the resultant height. Use these for email, uploads, and distribution.
8. After you are convinced you have your best photos in the HI folder and you've made your final edi:
  - a. You can then delete your Source folder to save space.
  - b. You should mark all your HI images as read only so they don't get accidentally changed.