Abstracts of Nicholas Hellmuth's more than 30 Reports on Digital Photography

Three levels of digital cameras at FLAAR ready for testing for use in the course by Nicholas Hellmuth: 35mm SLR Nikon D-100, medium format Hasselblad with Kodak Pro BackPlus; 4x5 with BetterLight scanning back.

Introduction

The abstracts let you know all the information and documentation you will receive from FLAAR and the several universities where Dr Hellmuth is a visiting professor. Now you can look forward to all this when you sign up for this digital photography course with Nicholas Hellmuth.

These 30+ reports form the textbook for the FLAAR course. The same textbook is used for all versions of the course. It is the same in person in Guatemala, in person in Malta, on the Internet via Bowling Green State University, Continuing Education. Only difference is that in Guatemala the material is presented via PowerPoint and via the Internet the material is delivered via Adobe Acrobat PDF. Some portions of the Internet version of the course may be delivered via WebCam video. All material is in full color.

This course is also available in-person at your museum, university, or community college. All it takes is an airplane ticket and modest funding to bring Professor Hellmuth to your campus. That's how he got to Malta to present the entire course there in person.

If you just can't wait and want all this material now, today, then you can sign up for a consulting relationship with FLAAR. You get the entire course materials, plus three telephone calls to Nicholas to ask your questions so he can answer directly for your specific individual needs.

> • *Learning about Digital Cameras*

SLR 35 mm Digital Cameras

Considering all the publicity from Foveon and Sigma should you select their new triple layer RGB color sensor system? And what about the Contax, with its full-frame 6 megapixel sensor? It took two years for this even to reach production stage and the first results posted on the Internet were embarrassingly poor. So what should you buy? Who can you trust? Our university is independent of any camera manufacturer so we can provide a more balanced view.

We have the Fuji S2 pro, Nikon D100, Sigma SD9 in-house ourselves already. The Canon models change so rapidly we use intensive stays at photography tradeshows to learn the pros and cons of each model. We anticipate trying out a Canon and the newest Kodak shortly. This report will be updated at every tradeshow before and during the run of the course.

Nikon D100

This illustrated report is based on six months testing including out on location in Guatemala and on the islands of Malta and Gozo (south of Sicily). We have also spoken with many other users of the Nikon D100, as well as people who use the Nikon D1 and D1x. At BGSU a Fuji S2 Pro was also available for comparison. So if you need help on deciding what 35mm SLR digital camera to buy, that's the strong point of this course.

And the nice feature of this course is that Professor Hellmuth does not sell cameras. So he has no need to hype one brand over another.

Sigma SD9 digital camera with Foveon Technology

Nicholas Hellmuth

Point-and-Shoot, 3 to 5 Megapixels

Nicholas Hellmuth

Sony DSC-F717 cybershot digital camera

Nicholas Hellmuth

Nikon Coolpix Digital Camera

Nicholas Hellmuth

Foveon technology in Sigma SD9 camera

This is one of the few reports available based on an actual photographer using the Foveon sensor in the Sigma camera out on location for an entire month. The triple-layer sensor (Red, Blue, Green) is the most innovative product of the digital millennium. If you are curious about the technology of the future of digital photography, you will enjoy learning from Nicholas about his experiences with the Foveon in the Sigma. In addition to using the camera under varied real-life conditions, Nicholas then enlarged the results on his arsenal of large-format inkjet printers to see how they looked.

An added advantage of this course is you get a photography instructor who can compare the key cameras with each other, since he could take the Foveon-Sigma camera out on the same day as he took the Nikon D100.

Point and Shoot, 3 to 5 Megapixels

Nikon claimed at PhotoExpo East that its CoolPix camera could produce a giant wide format inkjet print. Yet it was sort of bait and switch. The large print in the Nikon booth was actually badly pixilated. The camera was incapable of producing an exhibit-quality image of those dimensions (roughly 3 x 5 feet). Yet with a large format digital camera we routinely produce museum-quality images 5 feet high by 21 feet long in size. But back to the reality of point-and-shoot. We have two Nikon CoolPix cameras, so can report what they do nicely, and where they fail totally.

There are two questions that most people come to this course for help on (relative to entry level cameras). First, should they spend the extra money and get a true SLR (with interchangeable lenses)? Or can they do okay with a point-and-shoot camera?

Second question is: which of the many point-and-shoot cameras is recommended? There are so many to chose from.

This report will be updated at every photography tradeshow during the run of the course.

Sony F717

The Sony Mavica started the era of point-and-shoot digital cameras that could actually produce usable quality. Today Sony Cybershot cameras are in the same megapixel range as the Nikon CoolPix and Minolta 7(H, Hi) models.
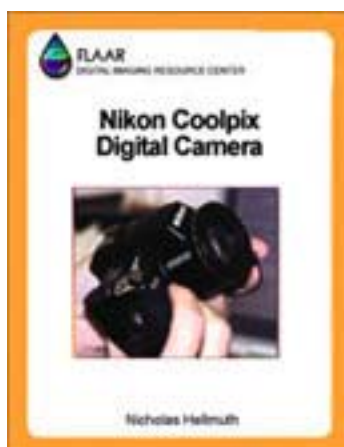
Nikon CoolPix 5700

Two of Nicholas' students had the model 5700. Nicholas himself had the 5000, the CoolPix 900, 950, and he started with an earlier CoolPix before that. So if you too wish to start off with this level of digital camera before you move onward, here is an opportunity to learn how to separate fact from fiction.

Do you really need a 35mm SLR with interchangeable lenses, or can you do just fine with a Sony, Nikon CoolPix, or equivalent entry level Canon or other brand? We can provide you with facts, and answers, because we have used cameras of each classification level (each level of technology and price).

The other factor relative to your selecting a camera is, how good a

photographer are you? The better you are, the easier it is to achieve great images from a modest camera. So we show results from a professional photographer who uses a Nikon CoolPix. How do they compare with the results if he had used a Hasselblad?

Don't laugh, because when you see the results, you would not guess they came from a point and shoot camera.

Large Format Cameras for Digital Photography
Discusses the pros and cons of 4x5 view cameras for studio photography, architectural photography, and other pertinent uses. Then reviews all the main books on large format cameras. Some titles are definitely much better than others. No books exist on large format digital cameras (that's why Nicholas Hellmuth has written all this material for this course). But traditional large format cameras are what hold the tri-linear scanning backs such as BetterLight, PhaseOne, Anagramm or Kigamo. Besides, many photographers use a large format camera to hold their medium format digital back (elsewhere we explain why that is not the way to go; you should be using one of two other cameras, discussed in pertinent FLAAR units).
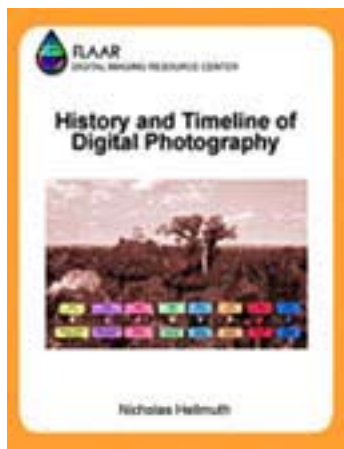
This learning unit discusses both the tri-linear backs themselves as well as the Sinar, Cambo, Linhof, Wisner, Toyo, Arca-Swiss, and other 4x5 cameras to hold these backs.

History of Digital Photography
FLAAR provides a concise history of digital photography, beginning with the birth of CCD sensors first used for television and continuing through up until today's quality digital still cameras. The report includes a convenient time-line that allows the user to put the development of digital photography in perspective. Last year brought an 11 megapixel CMOS sensor from Canon, a 13 megapixel 35mm SLR (from Kodak) and a 22 megapixel camera (from Sinar). All the new items from year 2003 will be reported by Dr Hellmuth directly from the floor of the key photography tradeshows. Fuji has already announced an upcoming 20 megapixel chip for medium format backs.

Digital Backs for Medium Format Cameras
Leaf, Sinar, PhaseOne, Jenoptik, Kodak, and Imacon are the survivors in this market today. If you are about to plunk down $15,000 to $25,000 for one of these, you might like to know the pros and cons beforehand? Might be able to save lots of money (certainly enough to pay for this course).

But actually, did you ask yourself the question, in the year 2003 and 2004, is a medium format camera still a viable option compared with large format at the high end and the new generations of 35mm SLR at professional entry level? Other than impress your clients with a giant back, what can these costly systems actually do that is superior to a full-frame 6 megapixel 35mm system of the next generation? You ask about the micro-scan and macro-scan medium format that produce larger files? But if you do multi-shot then why don't you move all the

way to large format? These are questions that few people dare to raise, and even fewer photographers are experienced enough to attempt to answer.

This discussion is based on four decades experience using medium format cameras from a twin-lens Rollei in 1965 to multiple Hasselblads before Professor Hellmuth switched to digital photography.

It is tough to locate any book on medium format <u>digital</u> cameras. Since not much was available, in order to provide information for the participants in this course Dr Hellmuth simply spent several months over two years doing research on my own.

FLAAR has two large format scanning backs and two zoom-lens digital cameras. We have three Hasselblad cameras which we have used for decades so we know the world of medium format equipment. Actually Nicholas was using a twin-lens Rolleiflex for his first professional assignments (photography in Guatemala for the University of Pennsylvania museum of archaeology in 1965).

As background preparation for this chapter of the course we obtained a Kodak ProBack Plus and a Hasselbald 555 ELD medium format camera. That's $17,000 worth of medium format camera equipment. This is typical of the efforts that FLAAR devotes to preparation of this course on digital photography.

We also maintain contact with other photographers who have the medium format 645 version of the Kodak ProBack, primarily for use on the Mamiya, as the Hasselblad 645 camera is rather new (and at $6,000, rather pricey). But do you really need these expensive systems? Why can't you just use a Nikon D100? (We have one of each, so we can patiently explain the pros and cons of every size class of digital camera).

Today the main question that photographers ask is "What about the 22 megapixel Sinar medium format back? Is it worth its astronomical price?"

Another question on everyone's mind is the need for someone to tell more about the Fuji 20 megapixel sensor. So naturally we will find everything we can about the Fuji sensor to assist you in making an informed decision.

Comparison of a $1,099 digital camera and a $14,000 tri-linear scanning back.
Don't laugh. In some instances the photo from the Nikon Coolpix 5000 was outstanding. Main difference was that the results could not be enlarged much past tabloid size. The photos from the BetterLight were museum quality at mural sized enlargements.

In the national palace of Malta, we had about $40,000 worth of digital camera equipment and over $27,000 worth of digital lighting. Which camera resulted in the best pictures.

You would be surprised (and the manufacturers of the really expensive cameras already are taking notice). But it all depends what you need. The clients of a pro studio don't want to see a point-and-shoot camera in your hand. They want to see heavy iron… that's what they are paying for.

So we still love our BetterLight large format (it is absolutely outstanding for fine art giclée photography). We are estatic with the results from a Hasselblad with medium format (Kodak) back. Got museum quality from the Sigma SD9 and Nikon D100. But what was surprising, was the quality of the point-and-shoot cameras (Sony F717 and Nikon CoolPix).

Yet, if you need to achieve large format enlargements, sorry, not enough resolution in those economy cameras. So there is a benefit to every higher level of digital camera technology, which you have to balance with their specific downsides. This is the nature of this course: intelligent product comparison by a master photographer.

How to take Photographs with a reprographic copy stand
A brief report on using a tri-linear scanning back on a Kaiser copy stand. We have found the BetterLight is a good digital back for this use. If you have tons of money you can go for the Tarsia copy stand, but if your museum is like ours, we had to face a tight budget and went for the Kaiser version. This learning unit explains the pros and cons of working with a repro stand system in your home, studio, or place of work.

• *Learning practical aspects of Digital Photography*

Pros and Cons of Digital and Film Photography
When making the decision of whether to buy digital or traditional photography equipment, the FLAAR report on the pros and cons of both fields is invaluable. The discussion offers a frank analysis on aspects pointing out the better features of both, as well as the areas where your business can fail or prosper depending on whether you buy the wrong equipment or the proper technology. If you have any doubt about what direction you and/or your company is taking with regards to digital or traditional photography, this report will definitely help.

This is probably the most frank and direct assessment yet available by an experienced digital photographer on precisely the downsides of digital photography. Usually reports such as this are written by shills for the digital camera industry. Or by recent converts: nothing as fervent as a person who has left the backward world of traditional negatives and chromes.

On the other side of the fence are the sad holdouts of old-fashioned photography who bemoan the good old days. They decry all aspects of digital photography. In many cases they obviously don't have much digital experience. One of these writers admitted proudly that "I know nothing about computers and have no desire to learn digital photography."

Of course not, his million dollar photo lab and darkroom business was gradually going down the tubes because of advances of digital technology.

Nicholas Hellmuth owns no stock in any photography company. He is not paid by any digital camera manufacturer, nor by any film company. He owns four digital cameras but also three Hasselblads, two Nikons, a 4x5 Linhof, an 8x10 Linhof, two Cambo 4x5, a Wisner 4x5, and three Leicas. It's rare that you can get a balanced report based on knowledge of both digital and traditional photography.

If you wish to learn the benefits of digital photography, yet balanced with a frank appraisal of what aspects of photography you can still do much better with 35mm Kodakchrome, Ektachrome or Fujichrome in a Hasselblad, or 4x5 chromes in a Linhof or Sinar, then take this course by Nicholas Hellmuth. He has used all these films, in each size and class of camera from 35mm through 4x5 all the way up to 8x10 studio cameras.

Now Nicholas uses digital cameras, but explains why you should not throw away your Leicas, Njikons, Hasselblads, or Linhof cameras.

Nature Photography: Can today's Digital Cameras really handle it all?
Hellmuth has photographed reptiles and exotic tropical plants in many fascinating and remote locations. This experience results in practical tips on nature photography. He also does landscape photography in the Missouri Ozarks, which actually have areas that are still primitive in their own sense.

Yet there are some aspects of nature that a scanning back can't handle at all. Can you photograph eagles in the wild with a digital camera? Yes, but the real question is, will these photos really be as good as with a traditional Nikon, Canon, or Leica with 35mm slide film? So before you go out on location, you better know what to expect if you intend to switch to digital. And what about underwater photography with a digital camera?

How to do serious Digital Panoramic Photography
This report really introduces you to the art of digital panoramic photography with the Betterlight Pano/WideView system. Many important aspects of digital photography are discussed such as color management and other techniques necessary in taking high quality pictures. The report walks you through the entire process in a straightforward and easy to understand manner.

History of Panorama Photography, Circa 1840-1940
Part I of introduction to digital panorama photography. This report covers historic panorama cameras long before computerized turn-table panorama cameras became possible.

Survey of Panoramic Cameras
Part II of introduction to digital panorama photography. This unit covers ultra-wide angle cameras, and a host of sizes and shapes of cameras made in the last several decades. The last part of this unit covers all the panorama cameras with motors, some of which were not yet digital (Seitz Super RoundShot). FLAAR has one of these 70mm computerized pre-digital cameras, actually the last one made in Switzerland. FLAAR also has two BetterLight pano systems, the original Dicomed FieldPro (same pano system as Stephen Johnson) as well as the newest Pano/WideView with the BetterLight Super 6K.

QTVR Virtual Reality
There are three ways to obtain panoramic photographs:
- o   have a true rotating panorama head for distortion-free results.
- o   Use an ultra-wide angle lens or other dedicated pano system for one-shot panos
- o   Take overlapping regular 35mm shots and stitch them together digitally.

This learning unit covers the most economical solution, namely #3. The other learning units discuss the BetterLight rotating pano system.

QuickTime VirtualReality was a major breakthrough for Apple Computer company many years ago. But today their QTVR authoring studio has been long ago surpassed by other products from other companies which are better. FLAAR has done QTVR object movies as well as QTVR virtual spaces, both museum exhibit rooms in Guatemala and Mayan archaeological ruins in Honduras. So the report describes which software is recommended. Also mentions QTVR "scenes" which is a combination of objects within virtual spaces, or moving from one virtual room into the adjacent room, and so on.

QTVR, virtual object movies
If you are a museum, or if you need to show any product in rotating 3-dimensions, then you need to learn how easy it is to accomplish this. Nicholas can show you how, since he has been rotating museum objects digitally for years. You can learn to do this professionally for product photography, or do it as a hobby (you can even make your dog or cat a virtual object in three-dimensions if it will stay still long enough). Furthermore, Nicholas will explain how to build a 3-D turn-table at home (and avoid any expense of a commercial variety).
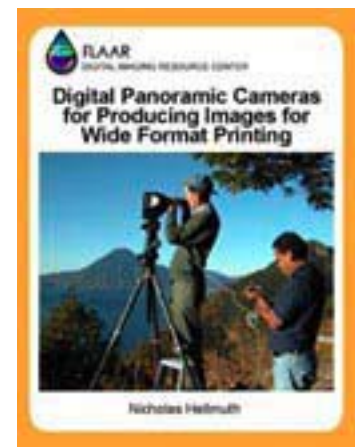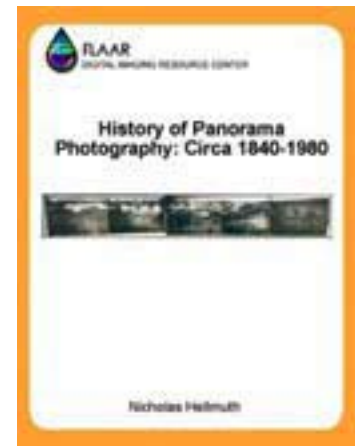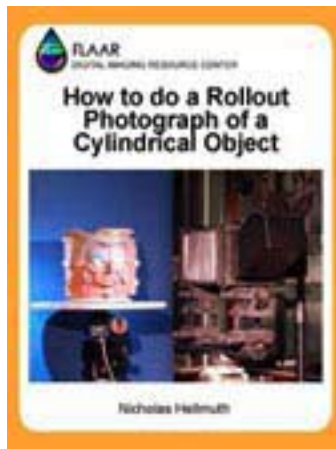
How to do a Rollout Photograph of a Cylindrical Object

This is the first complete published description, step by step, how to accomplish a circumferential photograph from a computerized turntable system which results in a rollout photograph precise enough to allow it to be enlarged to up to 15 feet long.

History of Rollout Photography Cameras

This report expands the excellent historical research of Andrew Davidhazy (Rochester Institute of Technology) by adding the more recent rollout cameras such as the Seitz Super RoundShot, as well as less well known rollout cameras produced in Belgium.
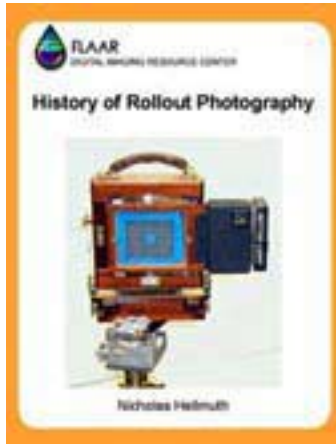
Architectural Photography with Digital Cameras

This report is based on decades of experience starting with photographing architecture while majoring in architectural sciences at Harvard. Following were years of photographing architectural landmarks while Visiting Fellow at Yale's Dept of History of Art. The result is one of the world's comprehensive photo archives of monumental architecture of the 4th-9th century Maya civilization of Mexico, Guatemala, Belize, and Honduras. Today you can get this experience distilled down to succinct tips and help on the pros and cons of various lenses, cameras, and digital technologies.
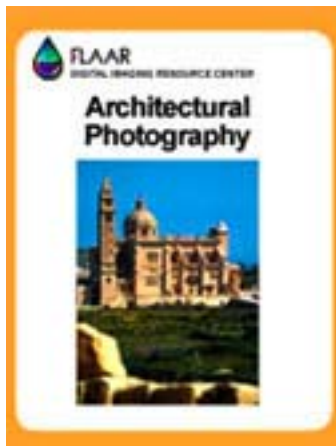
Fine Art Giclee Photography:

Doing fine art giclee printing with wide format inkjet printers is booming business (Thomas Kincaid makes millions of dollars a year). Nowadays you don't need an Iris printer either. You can print profitable artwork just fine with an Epson or HP 5500.

But what if you don't have a copy stand? Sure helps to know the tricks of how to get the painting digitized without a disaster. Every week someone writes us saying "I just bought a Nikon D100, and I intend to photograph paintings to do giclée prints."

Clearly the camera store never told them the facts of life. All they wanted to do was sell the camera as quickly as possible.
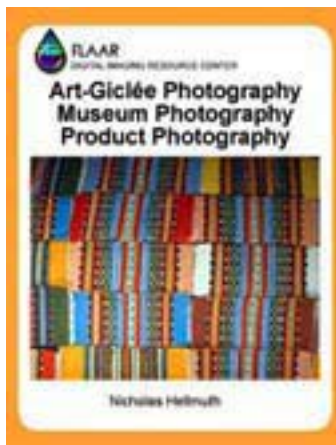
We will explain why some cameras are optically and physically incapable of photographing a painting. In instances where you can indeed user certain lenses, we document the absolute specific equipment which is required. This report is Part II of How to take Digitize artwork (Part I was how to digitize paintings with a copy stand).

> **• Understanding which Equipment works, which not, for Digital Photography**

Computer Equipment for Digital Imaging

Making your decision on equipment for advanced digital imaging of the large files necessary for wide format printers can be very difficult. Your decision on hardware will have an impact on your workflow. FLAAR discusses the polemics of PC vs Mac as well as reviewing monitors. Nowadays it is helpful to learn the difference between CRT and LCD monitors and how that affects color management.

This practical report by Nicholas Hellmuth is a great resource for those starting from scratch, or those interested in expanding on their existing equipment to handle digital images. Dr Hellmuth was a consultant for selecting the hardware and software for the Japanese National Museum of Ethnology when they decided to implement scanning and digital imaging.

FLAAR has about a dozen Mac computers and an increasing number of PCs, both Dell and Compaq. So we can provide painful experience in what are the true pros and cons of Mac vs PC: we have them both. Also, is it worthwhile investing in a dual processor computer? How much RAM do you really need? We can help you since we have already gone through all this before.

This learning unit also covers
- Hard drives
- SCSI vs IDE vs FireWire
- RAID systems

Other storage and transfer accessories
- Zip and Jaz drives (and their problems)
- CD-RW vs CD-R
- DVD-RAM vs DVD-R and RW (which one is not trustworthy)

Camera memory, storage (portable and stationary) and information transfer.

Learn the pros and cons of Sony "memory stick" as compared with CompactFlash. What about the 1 GB microdrive from IBM? Nicholas has seen all these in action (as you would expect considering how many diverse digital cameras he actually has available).

But after you take your pictures, how about storing them? Nicholas has over 112 GB of digital photos so far, and that is not counting his archive of over 50,000 traditional images of art and archaeology from his former life as a photographer in that field. So he will explain about RAID systems and all the diverse flavors of DVD (RAM, ROM, R, RW and all the alphabet soup). Dr Hellmuth has experience in digital image storing dating back to his being hired by the national museum of Japan on precisely this subject, back at the dawn of digital photography (1996).

Equipment needed for your Digital Photographic Studio
FLAAR has the advantage of decades of experience photographing on location as well as in their photo studio within the Popol Vuh Museum (of Mayan antiquities, in Guatemala). This experience is translated into practical tips for people who need to outfit their digital studio.

How much of your old equipment will work in a digital imaging workflow? How much will it cost you to update your studio to the requirements of digital photography?

Sure is a handy course.

The reality of photographing out on Location with digital camera equipment:
Nicholas Hellmuth brings thirty years of experience doing photography on location in Belize, Guatemala, Honduras, Mexico, Peru, and Malta to produce a guide for how to have the right equipment at the proper moment when you are miles from the nearest camera store. In addition to doing nature photography of tropical flora and fauna in the jungles of Central America, this book brings all the author's experiences with a portable photo studio photography in museums throughout Australia, Japan, Switzerland, Germany, and England. Thus you can look forward to tips on how to prepare a portable studio. For the last several years Hellmuth has done large format digital photography throughout Central America, so again, this FLAAR course is a rare source of tips on what equipment best serves each purpose.

Lenses and Filters
Nicholas Hellmuth offers an insightful report on both filters and lenses, two very important tools in your photography arsenal. Lenses are reviewed for large format, medium format, SLR, as well as digital cameras. In addition filters are reviewed for all cameras with tips describing which filters are used in which circumstance.

This FLAAR learning unit asks whether you realize the differences between the same lens, how it will act, on a digital camera and the same lens on a regular traditional camera.

Same with filters? Can you, or should you, continue to use your old filters? Which traditional filters will potential degrade your digital images? These are the little things that not many books on digital photography tell you about.

Most books on digital photography jump into Adobe Photoshop and don't really discuss the actual equipment needed for digital photography. So lenses are seldom even mentioned much less seriously discussed in books labeled "digital photography." It is as though the photographs appeared by immaculate conception: bam, the photo is in the computer.
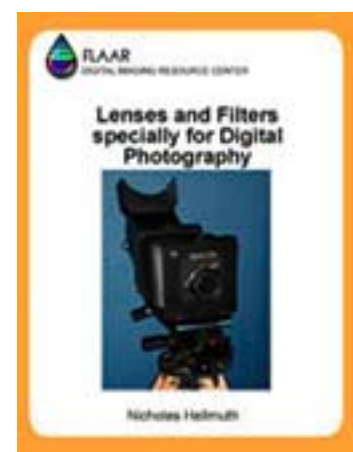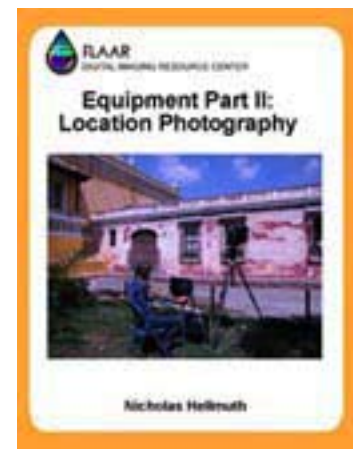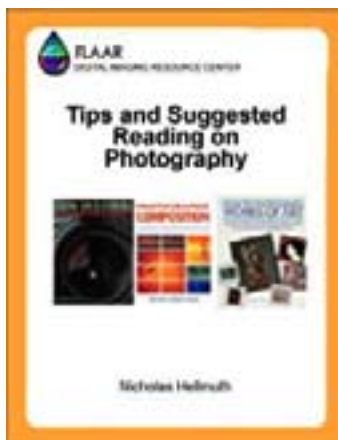
• Book Reviews of Digital Imaging

It is crucial to learn the reality of "digital lenses" and which of your old lenses can still work just fine on the newest digital cameras. The digital photography system is costly enough without adding the expense of new lenses which perhaps you don't need. Yet what if you just paid thousands of dollars for your digital camera and end up with lenses that work only for film, and not for digital cameras?

Nicholas Hellmuth brings to this discussion over 30 years experience with a wide range of lenses from extreme wide angle through macro through telephoto. He is especially good at lenses for Nikon, Leica, Hasselblad, as well as Schneider, Rodenstock, and Nikkor lenses for large format photography. We also listen and learn from the experiences of other professional photographers.

This course unit covers lenses for studio as well as for location photography, for product photography, portrait photography, architectural, art and conservation, as well as general photography.

We will first discuss aspects of lenses and filters which pertain to any and every digital camera size that you use. Remember that digital cameras come in four classes
- point and shoot, non-interchangeable zoom-lens
- 35mm SLR, interchangeable lenses
- medium format
- large format tri-linear scanning backs

FLAAR Book Reviews: Photography
Most good books on photography have not yet made the transition to the world of digital imaging. However many of these older classics on traditional 35mm, medium format, and large format photography with Kodak, Fuji, and Ilford film are still educational even in this digital millennium. This report introduces pertinent books on lenses, filters, cameras, techniques, lighting, and everything that digital photographers still need to learn in this new era of digital technology. The basics are still basic. Since many books exist on these photographic topics, it sure helps to have pithy book reviews that separate the wheat from the chaff.
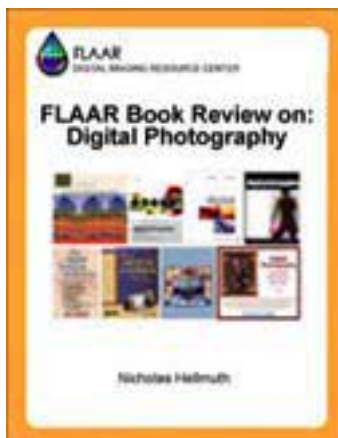
FLAAR Book Reviews: Digital Photography
Writing reviews on books about digital photography was a real eye opener. We found that the majority of these books did not really cover the subject of actual digital photography. Indeed what should have been the "best" book, written by professors at Rochester Institute of Technology, turned out to be the book with the least to do with digital photography at all (it turned out that under the misleading title page, the book was largely on traditional offset printing, the pet subject of those authors for decades). Indeed after reading all the books supposedly on digital photography we realized we needed

to write an entire textbook from scratch. So we dedicated the last three years to this task. Out of this project grew these roughly 30 chapters of our new textbook and this entire course.

During the last year, more new books on digital photography are being published than appeared during the preceding five years. Many cover only low-end cheapo digital snapshot cameras. It gets rather expensive to buy books, only to find out the author's portfolio features the family dog and grandchildren (in that order). So if you need to know about professional digital photography, we can help with tips on which are the books that discuss the things you need to advance in the competitive world of digital imaging.

FLAAR Book Reviews: Adobe Photoshop
Dozens of books on Adobe Photoshop vie for your attention. Most are excellent; a few are poorly organized. Some are outdated. Nicholas Hellmuth has read most of them. He selects the titles that are most appropriate for photographers working with digital cameras who need to handle their images in Adobe Photoshop. These book reviews make it a lot easier to know which books to skip, and which ones to buy and learn from.

FLAAR Book Reviews: Color Management
If we would all have the patience to learn color management our photography and resultant prints would not have such off-key colors. These reviews help you through the first step of color management: finding the best books and reading them. We tend to get every single title that is available, but that might get a bit costly for you, not to mention the time it takes to read them all. So these book reviews warn you which books you can skip, and which are essential to buy and read.

• Aspects of Digital Photography that are essential to know

Color Management for Digital Photography and Associated Wide Format Inkjet Printing
If you need serious help in advanced color management then you need a full course. These are readily available at $3,000 per 3-day course. Consultants can come to your company and train you in person for about $2,000 per day.

Next comes what Nicholas does best, preparing an absolutely thorough and comprehensive listing, fully annotated, of every color management software, ICC profiles tool, color measuring instrument, known to man or woman. Even includes the different brands available in Europe and naturally all the brands more popular in the USA. Covers color calibration of your monitor, of your camera, and of your printer. You have to learn how to do this on your own, but the purpose of this presentation is to be sure you have absolutely all the best documentation, tutorials, and wherewithal available from all the sources that Nicholas was able to track down.
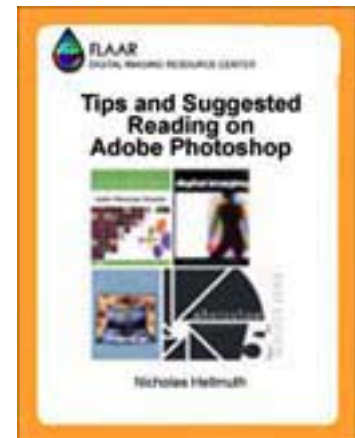
FLAAR provides an introductory analysis on color-management starting with digital cameras. This report guides you through the massive amounts of literature and webpages on the subject, while also introducing you to the jargon. The report is invaluable for those realize they need to get started learning color management as it provides tips and insights to help you make your decisions of what tools and software to consider.

Glossary of Digital Photography Terms
We found dozens of glossaries on the internet, but virtually none were complete. So our crew of editors gathered together all that we could find and then we added all the terms that were missing. After that we had the students tell us what other terms they needed to be defined. We added those as well.

Here are samples of the digital jargon you will learn
- aliasing
- bits and bytes, bit depth
- CMYK, RGB, LAB color spaces
- digital (what does digital really mean; did you know that no digital camera actually   takes a digital picture!)
- DPI vs PPI, what's the difference between dots per inch and pixels per inch
- dynamic range
- grayscale, what's that?
- histogram, what in the world is a histogram?
- interpolation(and how to avoid it)
- noise, as in digital noise, and how to avoid it
- pixels, these are things you want millions of. How? Why?
- pixelization (pixels are good, pixelization is bad)

and much much more

So now the FLAAR glossary of digital photography terms explains a wide spectrum of digital photography into wide format inkjet printing. This glossary is available only to participants of the FLAAR courses.

CCD and CMOS Image Sensors, Sources for information: Books and online
FLAAR's report on CCD and CMOS sensors gives you the low-down on how to acquire all the information you need about these sensors. The report covers books, brochures, and the internet, as technological information often appears in print much later than it does online. It is important to be informed on the topic and the FLAAR report tells you where to look while also grading the quality of information presented in each location.

We patiently explain the
- CCD kind of sensor
- the Bayer pattern of RGB filtration on most sensors
- CMOS kind of sensor
    o   how CMOS differs from CCD
    o   cheap CMOS cameras
    o   mid-range CMOS cameras
    o   noise problems with CMOS sensors

    o   How and why the Foveon chip on the Sigma SD9 avoids using the Bayer pattern

### Digital Image Resolution: How much dpi do you really need?

After we were unable to find any book which listed how much dpi each kind of printer actually required we began telephoning the printer manufacturers. Some responded that they did not know themselves, that no one had ever asked!

It turns out that each different printhead technology requires slightly different amount of pixels to produce a print. Piezo printers need more than thermal printers; laser imagers need twice the dpi of laser toner printers. Most thermal transfer resin and wax ribbon printers prefer large amount of pixels as input yet one brand will squeak by with just 50 dpi and turn that into continuous tone output of museum quality. One printer manufacturer admitted that the dpi listed for their printheads was not the true actual dpi, and that therefore their printers actually did not need very much file size at all. So if you have any interest in printing your digital photographs with a wide format printer of any technology, this one lecture unit will make the entire course worth your time.

This learning unit clarifies the distinction between dpi, ppi, and lpi in the context of how much resolution do you really need for

- Laser printers
- Normal letter size inkjet printers
- Wide format inkjet printers
- Continuous tone RGB printers such as LightJet and Durst Lambda
- Continuous tone dye sub printers
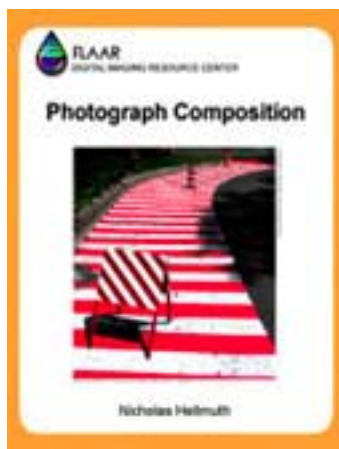
Composition: Key to Prize Winning Photos

Although composition is thoroughly covered in so many books, few authors have fully faced the reality of how composition with a digital camera is a different ballgame. Sometimes it seems as though the better the sensor, the less focus and depth of field you have. Plus you have to be realistic about digital noise and that digital cameras are not yet the best solution for wildlife photography (if you intend to get a shot with flawless focus, flawless depth of field, and absence of annoying noise). So it turns out that a discussion of digital photography does need to add special comments on the pros and cons of digital cameras when it comes to composing your image.

Bit Depth and Dynamic Range

Yes, do need to learn the basic jargon. This course will make you conversant in the mumbo-jumbo and arcane terminology of digital imaging.

The goal of this course is to assist you to become knowledgeable in the world of digital cameras of the latest technology. We want to be sure you can survive when hit by the hype and nonsense of ads foisted on the public by over-enthusiastic camera manufacturers.

Lighting for Digital Photography
Some kinds of digital cameras can't be used with either strobe or flash. Fluorescent lighting, which was the worst kind for photographing with film, turns out to be ideal for digital photography. If you have old strobes, how do you know whether they will work with a multi-shot medium format digital back? If you are already, or about to move, into digital studio photography, you probably think mainly about what camera to buy. But wait, the camera you buy conditions what lighting you can, or can't, utilize. So this FLAAR report is a considerable benefit for anyone interested in studio photography with any size or shape of digital camera. Virtually no book on studio lighting covers the reality of digital imaging. Few books on digital imaging even mention lighting, as though a digital photograph results from an immaculate conception.

Professor Hellmuth is keenly interested in all kinds of studio lighting, so you will learn about HMI, HDI (HQI) and other lighting which most authors of books blissfully ignore (because they just use one single kind of lights, usually strobes).
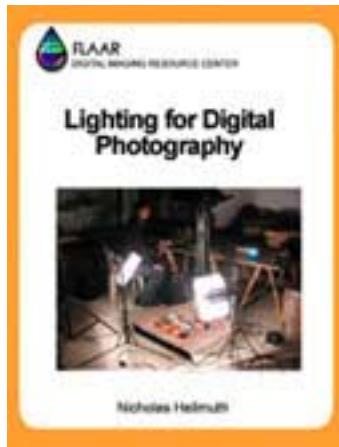
• Tips on Software for Digital Imaging

Adobe Photoshop for Photographers
Photoshop is the worldwide standard for digital imaging. Virtually every other photo editing software of the 1980's has disappeared: simply could not match Photoshop across all its features. Yes, many of these other programs had one or two aspects that indeed were better, but if you weighed the entire product against the next version of Photoshop, the other product just did not add up. By now Photoshop has added so many tools and filters that it is unlikely any other product will every catch up. However this report is not an homage to Adobe, but rather a list of which features of Photoshop you ought to concentrate on. After all, Photoshop can do say 100 things. But most of those are of need only for a graphic designer, or an artist doing composite images. What if you just want to improve your digital photographs, what seven key attributes should you dedicate yourself to?

Software other than Adobe Photoshop
Lots of small innovative companies make various software filters and add-ons which can do better than some of the traditional tools of Adobe Photoshop. But beware, sometimes you buy a software one day and the small company has disappeared the next day. So no more tech support, no more updates. This report not only separates the strong from the weak, it lists the best of the non-Adobe products.
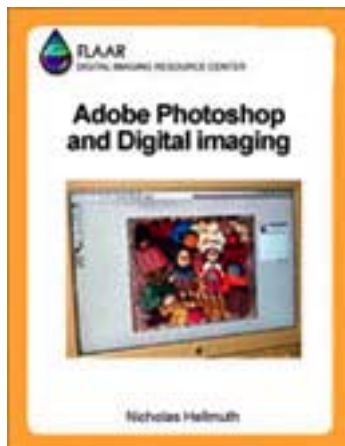
File Formats, including "Raw" file

There is no original negative any more in digital photography. Once professional photographers realized how much they had lost they began asking for a digital equivalent to a traditional negative. Software engineers responded with a "raw" file. However the camera companies never truly reveal what manipulations their systems have done to the supposedly raw file. I suspect most photographs would pass out, or ask for their money back, if they saw a true raw file. Nonetheless, raw is better than fully processed. So this course unit investigates various schemes of raw files, mostly proprietary, definitely incompatible with each other, and a mixed blessing.

> **• *Trade Shows for new digital cameras and wide format printers***

Report from the floor of PMA 2003, early March 2003. Obviously these reports will not be issued until we scrutinize all the products at the tradeshow.

What you will have learned from this course

With the tips provided during this comprehensive coruse, you will be prepared to select the appropriate digital camera, lighting, and accessories.

You will have learned which cameras do well, but in what situations they have problems. You will know what equipment is best for your individual situation and budget.

Link for Sign-up Form for this course via Internet at BGSU. Sign-up for Guatemala version, e-mail Cindy Shepherd, ctpid@ufm.edu.gt.

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Digital Photography
for Introductory into Intermediate

- **Digital Studio Photography • Digital Photography outside on location**
- **35mm SLR, medium format and large format digital photography**
- **As input for wide format printing**
- **How to select the digital camera which is best for your needs**
- **How to avoid choosing the wrong camera, lighting or accessories.**

❏ **Feb 26 through April, 2003. Sign-ups now being accepted**

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Refunding subject to BGSU (cancellation policies)

* We welcome participants from all countries. A Social Security No. is not required from outside USA; just let us know your Passport # or equivalent. Last semester we had students taking this course from Chile, Mexico, and England from the comfort of their homes and offices in these countries

• To comply with the Hope Scholarship and Lifetime Learning Tax Credit legislation, BGSU now requires all credit and noncredit US students to supply their social security number when registering for classes. Special accomodations available for international participants.

Bowling Green State University is on EO/AA employer and educator

Examples of the course units for intermediate, professional, and entry-level digital photography.

Course prepared by Dr Nicholas Hellmuth, available via the Internet in the comfort of your home or office anywhere in the world.

Architectural Photography

Black-and-White Digital Photography and Inkjet Printing

CCD and CMOS Image Sensors

Color Management for Digital Photography and Associated Wide Format Inkjet Printing

Photograph Composition

Lenses and Filters specially for Digital Photography

Scanners for digitalizing fine art

Lighting for Digital Photography

Glossary of Digital Photography and digital imaging terms

History and Timeline of Digital Photography

Kodak Pro back Plus Digital Camera

Large format Cameras

Large format digital (tri-linear) scanning backs

Computer monitors for digital phorography

Medium Format Digital Scanning Backs

Nikon Coolpix Digital Camera

Nikon D100 digital camera

Adobe Photoshop and Digital imaging

Point-and-Shoot, 3 to 5 Megapixels

Pros and Cons of Digital and Film Photography

Digital Image Resolution

Sigma SD9 digital camera with Foveon Techology

35mm SLR digital cameras

Sony DSC-F717 cybershot digital camera

Storage media: capture and transfer

Studio photography

Software that will Help your Digital Photography

Photokina Part I: Cameras

Photokina Part II: Wide Format Printers

See www.digital-photography.org for the syllabus and course abstracts