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Contents



THE INTERVIEW ISSUE

July 2021 / Vol. 92 No. 06

DEPARTMENTS

gear guide	18
first look	22
deep focus	24
exposure	26
production credits	120
stop motion	128

30

FEATURE 01 MOONLIGHT BECOMES HER

Darius Khondji, ASC, AFC, helps bring Stephen King's dark romance novel to the small screen in a new eight-part limited series.



FEATURE 02 FAMILY AFFAIR

Gabriel Beristain, ASC, BSC, AMC, captures Natasha Romanoff's dysfunctional past in Marvel's *Black Widow*.

46



SPECIAL 01 THE INTERVIEWS

60

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Light Speed and Beyond

In recent years, we have all witnessed dramatic technological changes that have affected every aspect of our work on sets. The list of those changes could fill this magazine and more. But what is most striking to me is the pace of all that change. Just when we think we have landed somewhere with new cameras or lights, equipment that may only be months old is suddenly eclipsed. I often wonder who and where the legions of designers and engineers are, working without sleep to bring so many new products to the marketplace.

Whoever they are, the burden immediately falls on our members and our vendors to supply and operate every new piece of gear. I applaud the risks vendors are willing to take when they invest in new gear, as well as the resilience and tenacity of our members.

Our training committee works tirelessly to update their curricula and prepare our members for whatever new capture devices and post demands come at them at warp speed. On my current show, my crew will handle 8K cameras, body cams and a hand-crank film camera, all without skipping a beat. Local 600 crews are second to none in their ability to embrace constant change, while simultaneously updating their knowledge base to craft the visual content that sets an industry standard.

The pages that follow in this month's *Interview* issue are filled with many of those inspiring stories, as well the voices of those vendors I mentioned, daring to push their own product lines on a daily basis in an effort to support union craftworkers.

John Lindley, ASC

National President
International Cinematographers Guild
IATSE Local 600



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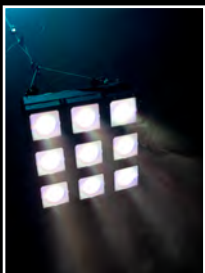
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with Titan Tube layout for standalone operation and DMX preparation

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removable, with Airline Track, 14" hole and 3/8"-16 UNC thread for hanging and mounting



Photo by Sara Terry

ICG's *Interview* Issue has always been a favorite (here in the virtual office and with our readers) for all the right reasons. The *Interview* section (page 60) gives voice not only to ICG members – including leading-edge DP's Markus Förderer, ASC, BVK, Baz Idoine and Martin Ruhe, ASC; and on-set color gurus DIT's Benny Estrada, Daniel Hernandez, and Spencer Shwetz. But we also hear from longtime ICG vendors, like Mark Ravenhill, Al DeMayo, and Bruce Markoe, as well as many crafts experts – IATSE Local 728 Chief Lighting Technician Mark Ardine, and Local 800 Art Directors Andrew Jones and Todd Cherniawsky. Add in super-high-functioning VR experts, like Scott Meadows and Kathryn Brillhart, and it's an *Interview* Issue to connect all the dots for questions about technology that's not only changing on-set workflows, but also redefining the work ICG members (and other union crafts departments) will be doing in the years ahead.

"Knowledge itself is power" is not just the goal of why we share each of these singular voices with ICG readers (or a quote attributed to 16th Century philosopher Sir Francis Bacon), it's also the working mantra of Chicago-based 2nd AC Shannon DeWolfe (*First Look*, page 22). Urged along her career path by Central Region AC's like Peter Kuttner and David Seekins, DeWolfe is passionate about educating new ICG members in the ways of union business, i.e., best safety practices, contracts and set etiquette. With prominent credits that include *American Horror Story*, *Empire*, *Tenet*, and *Fargo*, DeWolfe, an elected member of the Central Region Council and an NEB alternate, says her biggest reward comes when a new member is referred to *her* by other Local 600 members.

"I love that by making a simple phone call, you can connect people who might develop a working relationship that can last an entire career," she says in the profile. "You can make sure someone doesn't fall off the health plan, [and you can] spread the word that we've got a brand-new member to train and put to work."

Bringing out the best in ICG members

should be the theme of this month's *Deep Focus* (page 24) with Riki Leigh Arnold, senior photo editor for Walt Disney Pictures. Arnold, who has spent a career working closely with unit still photographers, says her craft (like everything else) has changed radically in the digital age.

"So much more time is devoted to keeping images secure," Arnold reveals in the article. "I'm constantly battling to balance sharing content with all the parties needing to review and use the images while keeping images from leaking to the public." And the sheer number of images used on a campaign has increased, with digital marketing teams requiring a large number beyond traditional publicity selections. "What hasn't changed," Arnold adds, "is my enjoyment of working with photographers. The best ones always find fresh and surprising takes on the coverage, especially the BTS, and I love that!"

Loving what they do – whether it's Camera Operator Michael "Bucky" Buck (highlighted in our article on *Lisey's Story*, page 30) helping to execute a spectacular move on a 75-foot Technocrane, or Director of Photography Gabriel Beristain, ASC, AMC, getting to shoot an entire Marvel feature (for first-time director Cate Shortland on *Black Widow*, page 46) after handling extensive additional photography on a half-dozen Marvel features – has always been a constant of our *Interview* Issue, here celebrating its 10th anniversary.

Peeking back at that first *Interview* issue, in 2011, I'm reminded how integral were the many portraits – shot by Local 600 unit photographers as with this 2021 version – which accompanied all those insightful words. Photographers from that 2011 issue, such as Matt Dinerstein; Nicola Goode, SMPSP; Frank Masi, SMPSP; and Beth Dubber, have all enjoyed long ICG careers, as no doubt will some of the newer names in our 2021 issue, including Adrian S. Burrows, Sr.; Elisabeth Caren; Troy Harvey; and Tobin Yelland. Giving voice to industry professionals who excel at their craft, whether it be in words or pictures, will always be a reason for ICG readers to embrace this special theme issue: ten, twenty or one hundred years down the road.

David Geffner

Executive Editor

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Peter Kramer

Moonlight Becomes Her, *Stop Motion*

"One of the most important things to me working as a unit still photographer is meeting new creative people. And here's some advice: Be kind to everyone. Don't be a dick!"



Troy Harvey

Interview Section – Bright & Shiny

"One of the many pleasures of being a unit still photographer is being able to capture people doing what they love, and that was especially true for this portrait series. These are the individuals who are rarely recognized for their work but are responsible for the magic needed to bring the many stories we love to watch to life."



Cover photo by Peter Kramer

Add Flare to Your Filmmaking



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ZEISS has added four new lenses to the ZEISS Supreme Prime Radiance family. The 18mm and 135mm focal lengths add telephoto and wide-angle specialties and the new 40mm and 65mm lenses enhance the standard range. The ZEISS Supreme Prime Radiance family now covers all possible applications for high-end film production. With a maximum aperture of T1.5, controlled flare characteristics can be achieved, even in low light conditions.

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Seeing beyond

Cinefade RotaPola

\$9,918

WWW.CINEFADE.COM

Polarizers are essential on any automotive shoot to control reflections on the vehicle's body and windshield, especially if the camera is inaccessible, such as on a Russian Arm. "I was able to use the Cinefade RotaPola in motion," describes Björn Tagemose of his seven-day shoot for Porsche. "Just like pulling focus, it becomes an organic thing that dynamically changes the reflections in the car." The RotaPola is the only high-quality polarizer with a in-built motor, interfacing directly with a cmotion cPRO wireless lens-control system. Insert the motorized polarizer into a 4-inch-by-5-inch matte box, and daisy-chain via LBUS to the lens motors or directly to the transmitter to remotely control 180 degrees of polarization angle without the hassle of mounting and calibrating an external motor. With an exact readout of the current filter position displayed on the hand unit, AC Nathan Lederman could set the beginning and end positions of the polarizer for each camera move and dynamically adjust the polarization angle between the two positions. "I used the Cinefade RotaPola to make reflections less disturbing, to not let them draw attention and to keep the car looking its best," Tagemose explains.



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This new dual-band wireless DMX system gives lighting operators the freedom to change lighting settings, DMX addresses, and control modes on the fly for precision lighting control at a level not previously possible. The Apollo Bridge and iOS Lighticians Apollo Control app use advanced dynamic frequency-hopping technology to create a robust wireless DMX network anywhere, instantly. IATSE Local 52 Lighting Console Operator Daniel Choy Boyar put the Apollo through extensive daily use in studio environments, dense interior locations, and harsh winter conditions on N.Y.C. exterior locations. "It's not just a LumenRadio transmitter," he reports, "but also a new feature-rich class of CRMX base stations with the latest LumenRadio TimoTwo chip. It has unique abilities like dual-band enterprise-class Wi-Fi, DMX out, advanced network management, and a WAN port. It's a bulletproof hub for an entire lighting network with more capability than anything else on the market." With built-in dynamic RF transmission, the system supports both 2.4 and 5 GHz and automatically avoids network interference to create a robust signal. Simultaneous CRMX and wired DMX output can be used to provide a built-in fail-safe or to quickly add more fixtures without needing to reconfigure a DMX network.



Nauticam Underwater Housing for Sony a7S III

\$3,189

WWW.NAUSICAM.COM

This new unit provides fingertip access to all key camera controls in a rugged and reliable aluminum underwater housing. Ergonomic camera control access is one of the defining strengths of a Nauticam housing, and this one continues the tradition. The N100 system includes a full range of both macro and wide-angle ports and delivers access to the lineup of Nauticam's professional wet optics that are optimized for underwater imaging, such as the WACP-1/2 and the SMC-1/2 lenses. These optics deliver unparalleled image quality underwater, expanding what is possible with the powerful a7S III camera. The housing features a double thumb lever within easy reach of the right handle that triggers the AF-ON and Record controls of the camera. The left-side thumb lever toggles the Playback button. The back panel provides access to all rear camera controls. With the addition of an optional M14 vacuum valve, the monitoring system provides constant updates on the water-tight and safe-to-dive status of the housing. "Considering all the extreme environments I've put the Nauticam NA- a7S III through," remarks cinematographer Cristian Dimitrius, "I can say it's one of the most reliable and intuitive underwater housings on the market."

Bright Tangerine Axl EVF Mount

\$567 TO \$697

WWW.BRIGHTTANGERINE.COM

"The Bright Tangerine Axl feels like a breath of fresh air," says Director of Photography David Doom. "Finally, a viewfinder that can slide far enough that I can use with my left eye. Other viewfinder brackets come a little short, but this is just perfect." The Axl mount is engineered for camera operators and assistants who know the value of every second. What makes Axl so quick to use is the Multi-Axis lock. Operated with a single knurled handle, it enables you to quickly position and tighten your EVF in three different axes all at once. It eliminates any fiddling or fumbling with multiple knobs and screws that you find with many standard mounts. The support arm itself also features a drop-free, fluid movement, remaining under tension to keep your EVF safe from dings. Even when it's loosened, your EVF won't flop or drop down suddenly. The mount works with a wide range of EVFs, including ARRI, Canon, Zacuto & more. All the user has to do is select the right kit for their favorite camera. Bright Tangerine also offers plates, rods and additional accessories for the Axl mount if needed.



Ncam Reality 2021

HARDWARE FROM \$5,995

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WWW.NCAM-TECH.COM

“At any time of day, I need to be able to swiftly move through my camera settings and adjust camera tracking for different shooting situations,” says Director of Virtual Production Asa Bailey. “In the morning, I can be shooting in-camera on LED; after lunch I’m shooting on blue screen and, with Ncam, I can even go outside and previs VFX on locations. The software has been designed for people with a camera-department background.” The new Ncam Reality solution includes Mk2 Camera Bar, Mk2 Server, and Ncam Reality software, which offer advanced tracking indoors and out, using a lightweight design that fits any camera. Hybrid sensors can handle every tracking technique – from natural features and fiducial objects to reflective markers. With seamless integration with Unreal Engine and native support for LED walls, Ncam Reality allows VFX teams to explore virtual locations, character designs and shot options with the director and cinematographer early in the process. By creating a 3D point cloud of the surrounding environment, the software can automatically determine the optimum tracking algorithm for any point in time. Camera tracking data, including FIZ, can be recorded for use in postproduction, enabling efficiencies within the VFX process.



Broadcast-IN's Micro Pan/Tilt Head

\$1,499

WWW.BROADCAST-IN.COM

At just 90 mm tall (3.5 × 2.18 × 1.77 in.), Belgium-based Broadcast-IN's micro pan/tilt head may be the smallest remote head ever created. The head was specifically designed to give the user more creative options when shooting with the new range of micro-cameras. Rugged and waterproof, it offers both indoor and outdoor shot possibilities that were previously unattainable. Configured for maximum flexibility, it can be used inverted or upright, with a series of presets for ease of changing position. The Micro Pan/Tilt Head's normal input voltage is from 12 to 35 volts, offering a huge range via cable if the supply voltage is increased. There is also a built-in camera power supply to deliver a constant 12 volts to the camera socket. Most unusual for a pan/tilt head of this size is the placement of the input socket for power and control data, which is on the fixed base. This allows for better freedom of movement with the socket on the moving part with the camera. “I was looking for such a small system to use with my POV cameras,” describes Peru Kepa of LogoDos Productions. “This remote head allowed me to use mini cameras in places where a normal camera would not fit, helping to increase the quality of my productions.”



Wooden Camera Mini Vertical Bracket

BRACKET ONLY \$195.

KIT PRICING DEPENDS ON THE PACKAGE.

WWW.WOODENCAMERA.COM

Wooden Camera has long been known for helping all forms of production become accessible, faster, safer and more creative. A recent addition to their vertical content creation inventory is the Mini Vertical Camera Bracket. As Local 600 Director of Photography Graham Ehlers Sheldon states: "The developing nature of how the audience consumes content means that for capturing in the new 9 by 16 format, I need a safe and practical way to mount a true cinema camera. The Wooden Camera vertical mount, alongside their Touch and Go system, meets that need. Using both made medium-body-cinema-camera vertical setups quick and easy. For monitoring, I used my trusty Wooden Camera Director's Monitor V3 and the new vertical conversion kit. It has room for onboard accessories like wireless and follow-focus, and keeps the camera safe during filming." The new bracket features $\frac{1}{4}$ -20 and $\frac{3}{8}$ -16 threaded holes plus pass-through slots on both its horizontal and vertical plates for attaching tripod plates and camera bodies. Wooden Camera suggests using a DMCv3 Vertical Camera Adapter for vertical video monitoring. Handle adapters are installed on the top and bottom brackets of the cage. Included c-stand adapter can be installed on the lower rod, allowing the vertical configuration to be mounted on a baby pin.

Focusbug by Hedén Group

\$225

WWW.HEDEN.SE

"The integration of Focusbug and Hedén is what many of us have been longing for – to dramatically improve the success of difficult focus pulls but not abandon control completely to an automatic system," says Director of Photography Brian Murie. "The YMER-3 and Focusbug pairing places our camera team in control because the focus puller has complete authority over the system. I can work with the assistant to set the parameters for a particular shot, as well as devise a shot that would have been nearly impossible to nail consistently before, and likely very time-consuming and taxing on our team." Murie points to a shot like a hard run directly at the camera holding focus on the actor's eye. "In the past," he continues, "the focus puller would need time, careful measurements, and a deep Zen state to nail those shots even once. And we'd be lucky to get even two clean takes, with the actor also looking his or her best in those shots. Pairing Focusbug to YMER-3 allows flawlessly repeated shots – and the focus puller can also take full manual control of focus anywhere in the process if needed."





Shannon DeWolfe

BY PAULINE ROGERS
PHOTO BY ADRIAN S. BURROWS SR.

At eight years old, growing up in the suburbs of Illinois, Shannon DeWolfe felt a special “zing” watching the Oscars, and that fueled an urge to be a part of the film and TV industry – in the camera department, specifically, because, as she told her mother, “I’ll have a front-row seat to all of the action because you can’t do anything without the camera.”

That enthusiasm carried DeWolfe through Columbia College in Chicago, where she focused on cinematography. Her first job in the business was in Gurnee, IL, working as a personal assistant for director Patrick Read Johnson on his coming-of-age film, *5-25-77*. That gig provided a crash course on all things production-related.

“I did everything,” she laughs, “from reading the script, watching casting calls, scouting locations, and fetching folks from the airport. I got to hone my people skills when a crew member accidentally ran over the kitten of one of Patrick’s children. I had to hide it in a shoebox and bury it in the forest during an overnight shoot in the pouring rain.”

Although DeWolfe says she was “not a very good assistant,” a year later, when the production returned for reshoots, she was able to join on as a camera team member. When she got a call from [Chicago-based 1st AC] Peter Kuttner saying he’d passed along her name for a movie shooting in Detroit (*Whip It*), DeWolfe’s career took off. Her path as a 2nd AC has been further cemented by working on such high-profile shows as *American Horror Story*, *Empire*, *Tenet*, and *Fargo*. She still laughs about getting on *Fargo*. So anxious to work on the Emmy-winning series, she cold-called 1st AC David Seekins, who hired her because she had “just the right amount of ballsy.”

For DeWolfe, there are two sides to working in the industry. There is the “work” on set – and the “work” within the Local, “which is what keeps me engaged,” she enthuses. “So many people have helped me along the way. By returning that kindness, I’m ensuring the set is infused with what it means to be a Local 600 member. When you become educated on a subject, your confidence grows, and you begin to see the bigger picture – on set and in the politics of our Union – which makes you feel empowered. Knowledge pushes out uncertainty.”

Ten years into her membership, DeWolfe is deeply involved in the business side of Local 600, which she says is a natural fit.

“Having conversations at the lunch table about contracts, you start to help out new members; you understand the gritty details of how we work as a local and that you are in fact ‘doing the work.’”

DeWolfe is a big fan of breaking down a seemingly complicated process into manageable bites. “I can say this to others because I do this for myself,” she adds. “There are a lot of things in the day-to-day business of what we do on set that can seem complicated and intimidating. Whether it’s the logistics of organizing and getting gear from A to B, an additional unit, or the parameters of keeping a safe set. The greatest resource we have is our other members. It’s important to know that you aren’t alone.”

Personal rewards often come when a new member is referred to DeWolfe by other Local 600 members. “The initial contact always looks like: ‘I’ve just joined the Local, and so-and-so said I should reach out to you,’” she explains. “I love the idea that by taking the time and making a simple phone call, you can connect people who might develop a working relationship that can last an entire career. You can make sure someone doesn’t fall off the health plan, spread the word we’ve got a brand-new member to train and put to work.”

While DeWolfe says the Guild’s numbers are “growing rapidly” due to exploding demand for content, “many of these newer members aren’t focused on the business side of what we do,” she insists. “They join for the passion of filmmaking and are focused on getting their careers going. However, I do believe that by having on-set conversations with members about how contracts and bargaining can directly affect their day-to-day, they start to understand the bigger picture.”

“We are so diversified now with women’s committees, green committees, and the Young Workers,” she continues. “There’s a place for anyone who wants to dive deeper into a particular interest he or she might have. But you have to make them aware that it exists.”

As an elected member of the Central Region Council and an NEB alternate, DeWolfe is deeply involved in training and the politics of what it means to be a union professional. However, she concludes, “I will always be that girl who nervously cold-called for the jobs she wanted, so when members start to cold-call me, I’m very quick to let them know they came to the right place.”





Riki Leigh Arnold

SENIOR PHOTO EDITOR | WALT DISNEY PICTURES

PHOTO BY ELISABETH CAREN

I had never edited photography before but had grown up with it – my father was a photographer, and I loved and studied the history of photography. I had just finished my MFA at Otis Parsons and was trying to figure out whether I had what it takes to make it as an artist (I didn't, as it turns out), when a friend introduced me to Daniel Roebuck, who was starting a boutique photo agency called Onyx.

I was used to critiquing visuals from Otis and learned on the job, editing photos for syndication packages, understanding who the up-and-coming photographers were and how shoots were put together. That eventually led to an introduction to Cheryl Boone Isaacs, who was looking for someone to lead her photo team at Paramount.

Becoming a studio photo editor at Paramount was a new world. I learned that it's not enough for a photo to be visually compelling; it also has to sync up with the positioning efforts of the marketing and publicity teams. [I also learned] that it's important not to get bogged down in the detail of a particular moment in the film.

When choosing a photo, I like to mentally step back and ask myself, "If I knew nothing about this film, would this image intrigue me to want to see it?" I learned early that in each project, each group of filmmakers has their style, flexibility is key, and it is important to remember that I am a publicist as well as a photo editor.

One of the most memorable films from my Paramount days was *Titanic*. Such beautiful photos but always a challenge because of the size of the

project and the attention focused on it. The most unusual aspect came from the enormous ship being fully complete on only one side, so scenes from the other side were shot flopped. That meant the stills had to be flopped as well and if there wasn't any signage in the photo I had to look for other details, like the buttons on the male characters' coats and vests. I spent a lot of time with the loupe looking for those details because it had to be right.

The industry has changed in countless ways. The pace is much faster – for the photographer, for the editor, and for the whole campaign. The omnipresence of phones and cameras means that establishing the key first impression happens earlier in the process.

As an editor, you need to communicate with the photographer and keep on top of the images as they come in. Communication with the unit publicist also becomes more critical. You need to be aware of situations where the public has an opportunity to grab a shot.

The transition from film to digital has meant that much more time is devoted to keeping images secure. I'm constantly battling to balance sharing content with all the parties needing to review and use the images, while keeping images from leaking to the public.


The number of images used on a campaign has increased, with digital marketing teams requiring a large number of images beyond traditional publicity selections. They may have their teams or talent from the film shooting for them as well.

So editors need to consider those images when making key selections.

The biggest change may be the sheer number of daily photos out in the world, and the ever-increasing number of people creating those images. The competition is fierce, so you have to work harder at finding the photos that resonate. The best ones still stand out because they are technically well done, well-composed, and tell an intriguing story.

Moving over to Disney has brought new challenges because such a wide range of divisions across the company use photos. The photos I choose might appear in the parks or the Disney stores, as well as on merchandise and at themed events. The Disney publicity team is global, so those activations happen all over the world.

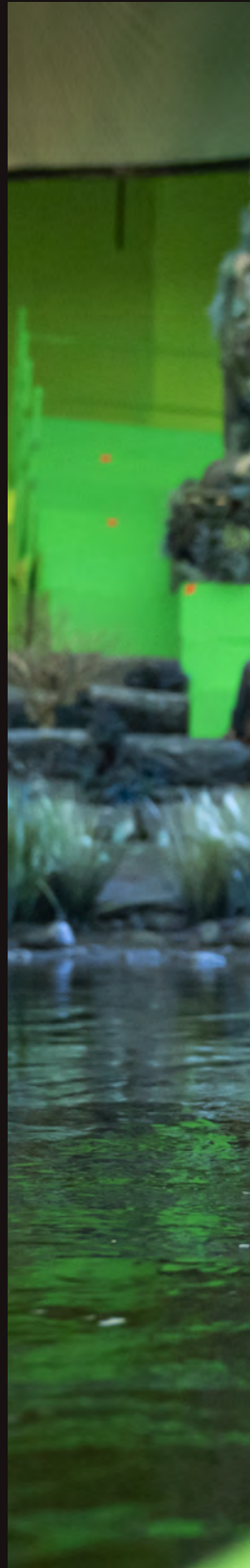
The 2020 launch of the studio's streaming service, Disney+, has opened up another world in terms of episodic television and short films. It's a challenge in volume and pace, but it's also exciting to explore a new area.

One thing that hasn't changed is the enjoyment of working with photographers. The best ones always find fresh and surprising takes on the coverage, especially the BTS, and I love that. When I go through the coverage and an image pops, it's exciting. Maybe it's a perfect first look that spells out the essence of the film without giving too much away. Or an image for later in the campaign once more of the plot and characters have been revealed. Or it could be one of those shots that are beautiful but only work for special pieces. 

Pablo Larraín

DIRECTOR | *LISEY'S STORY*

BY MATT HURWITZ / PHOTOS BY PETER KRAMER





Chilean-born filmmaker Pablo Larraín is known not only for his work in his native country and titles like *The Club*, *Tony Manero*, and the Oscar-nominated *No* but also for U.S.-based films like the Oscar-nominated *Jackie*, starring Natalie Portman as former First Lady Jacqueline Kennedy [ICG Magazine December 2016]. Larraín and his brother, Juan de Dios Larraín, formed a production company, Fábula, in 2003, to support the work of emerging directors. From that association came Sebastián Lelio's *A Fantastic Woman* (2017), the first Chilean film to win the Academy Award for Best Foreign Language Film. Apple TV+'s *Lisey's Story*, adapted by Stephen King from his 2006 novel and for which Larraín directed all eight episodes, brings the Chilean filmmaker into the world of fantasy horror, as well as his more familiar territory exploring rich and emotional romantic relationships. ICG Contributor Matt Hurwitz talked to Larraín about his approach to working in a story with fantasy and psychological terror.

ICG: Working in fantasy is somewhat new to you.

What drew you to this project? Pablo Larraín: I've done some psychological terror, in a way, based on memory – *The Club* and even *Jackie*. This story is a love story – about memory: when you get into the memory of someone who is in grief, and they're trying to put themselves together, to move on with their life – as Lisey does here.

What did you draw, visually, from King's novel and his teleplay?

Stephen is a very visual writer whose work is filled with images. So the elements were already there in the book. Our challenge was to deliver something that would have its own space, in terms of imagery. The thing is, Stephen's work is so huge and so diverse, there isn't one single idea behind it. He's done everything from *Stand By Me* to *Carrie*, *The Shining*, *The Shawshank Redemption* – and *Lisey*. Every story is different. I think one of the biggest lessons I learned from him is that you have to work out things throughout human relationships, and very simple and universal emotions. Once you do that, then we can all connect with the characters and what they're going through. And since this was such a personal, private story for him, I had a responsibility to put that into images. And I couldn't have a better crew to do that with.

What was your approach to make it fantastical as well as scary?

A challenge for me was being able to assume that the fantasy elements could be real – just as Lisey, who is in denial, does in the story. Stephen said if I didn't believe in it, I wouldn't be able to do my job well. So I embraced it. What

Guy Dyas, our production designer, Darius Khondji [ASC], our DP, and myself did is to base all of the fantasy world – *Boo'ya Moon*, the Fairy Forest – in nature. At its heart, it's based on something that can exist. And when that happens, there is an element that you can lay on and deal with. Terror can come from different sources. So, for us, when the unknown exists in a space that is real and believable, it's stronger – because you think it's possible. There's nothing scarier than our minds and imagination.

Many important scenes in the series take place almost in darkness. Tell us about that approach and why it works so well.

Well, you're talking about Darius Khondji – the Prince of Darkness! [Laughs.] One thing we do is make sure, in an environment that's barely lit, that you can still see [the characters'] faces and share their emotions.

There are a couple of scenes in which the evil character, Jimmy Dooley, is beating Lisey most horribly. We never see him physically striking her, we just hear it and her awful screams.

The two characters are never together, and there's no physical contact between them. You see one side, then you see the other. But they're never in the same shot while the violence is happening. We wanted the audience to put it together in a way that's more horrific than if we showed it. When the audience is completing the image, it's more terrifying. Sound plays a big role because it creates a horrific feeling like nothing else would. It was essential.

Did you shoot the show two-camera or single?

We started with two cameras, but what happens, when you work with two cameras, is you start to compromise your A camera. So, within a few weeks, we decided to stay with single camera. Then, all our eyes were placed on a single monitor. We had our Steadicam operator, Jim McConkey [SOC], who is an absolute genius, and then we brought in Wylda Bayrón on B, who is just incredible. And we would bring the B team in for specific sequences when needed. At the same time, we would use these Blackwing lenses, sort of mid-wide angles we would use. And what that does is it brings the camera close to the actors, instead of when you have long lenses, and the camera is away from the actors. And that changes the relationship with the audience. If the camera is close to the actors, then the audience feels that they're closer to the actors.

The *Boo'ya Moon* sequences were shot on a massive set, on large Technocranes, one of them 75 feet high. What advantage did that bring?

It was the only real way to do it, something our key grip, Richie Guinness, figured out. There's water on one side, stepped benches on the other, and lights all around, above the stage. So the only way to do it was with a crane that could fly into the characters, and frame what we wanted to frame. We had several on the set, and we could just move the camera from one to the other. And that 75-foot crane – I named it "Medea" – could go really, really far, really high. But sometimes, we were just doing close-ups with it, because it was the most simple and efficient way to film. These telescopic cranes

are a gorgeous invention. But it's not just the equipment, you need the right people, all working in sync, which is what we had.

Your focus puller, Chris Silano, was telling us about his use of the Preston Light Ranger. How did you find that helped with your work here? I've never seen anything like that in my life, nor someone with those skills. Neither Darius nor I could believe it. We only had two shots in the whole project that we didn't use, which were slightly out of focus. That's insane! Especially with that sensor and how shallow the focus could be. Our perspective was always in the eyes of the characters. The eyes become everything, especially when you have such shallow focus with these lenses. And especially when you have the camera close to the actors – you have to choose where you are and what you're looking at. And that was always the eyes. That's what you're looking at, that's how you connect. The eyes are conducting the narrative.

A *Fantastic Woman*, produced by you and your brother's company, was the first Chilean film to win the Academy Award. How have you supported filmmakers from your own country on the international stage? It's not so much support as just working with people we admire. We've made 40 movies in the last 15 years, some more known than others, many times with first-time directors who we want to build long-term relationships with. We have an office in L.A., as well as in Mexico, so it's exciting – and challenging – as these productions take shape beyond our own country. Of course, it's also a little selfish for me – as a director, I don't get to experience all these different types of projects, the way a DP, production designer, or even an actor will. [His production company] lets me connect to other filmmakers who I would never get to meet or work with.

You mentioned Mexico – I'm wondering why so many talented Mexican filmmakers –Rodrigo Prieto, Chivo, Guillermo del Toro, just to name a few – have had success in the U.S. but less so for Central and South American filmmakers. I don't know the answer to that, other than there are many interesting filmmakers in Latin America who are not necessarily interested in the production system Hollywood offers. Lucrecia Martel and Mariano Llinás are two that come to mind from Argentina who are wonderfully talented but just don't appear to have a need to work over here. And it's true, you do see many international films having success in the U.S., and they don't need to be English language. That's the point Bong Joon Ho was making [in his Oscar acceptance speech for *Parasite*]: "guys, you can read subtitles" and still have a compelling

experience. The film culture in the U.S. has been used to English language movies for so long, that it's been slow to accept other cultures and ways of looking at the world. Certainly, the process of making movies is a common, global language, so why can't the product of those artisans be as well?

Good transition to my last question. You had incredible praise for your New York-based crew. Do you bring anything over from the crews in your country and the converse – take what our members do back to Chile? As I said, making movies is the same everywhere. The tools are the same, and it often comes down to one or two cameras looking at an actor or two. But I will say the technicians I worked with in New York are of such a high quality that they become artists. They pull focus, move a dolly or crane with such precision that it mirrors the heart of the story. They understand the emotion of the scene and that was amazing. At that same time,

the crews are much larger, and that's different than how we work [in Chile]. We will try similar things with fewer people. What was very different for me was working with visual effects. I had some crazy questions for them and always the answer was: "we can do whatever you want!" I've not had that kind of access in my career before. I will say that we provide many services to productions that come to Chile, and that has helped improve not only the level of talent with our technicians but the standards as well. I remember a film we did years ago, in Santiago, where we discovered a problem with one of the film magazines that made all the material out of focus. We took the numbers off all the magazines, so we didn't know which was the damaged one and just kept shooting! We got many beautiful out-of-focus shots that created some mystery. That film was called *Tony Manero* [nominated for Mexico's Ariel for Best Latin-American film]. I think if I did that today they'd probably take me to jail. [Laughs.] 🌈



Feature



01



M O O N L I G

DARIUS KHONDJI, ASC, AFC, HELPS BRING STEPHEN KING'S DARK ROMANCE NOVEL TO THE SMALL SCREEN IN A NEW EIGHT-PART LIMITED SERIES.

BY: MATT HURWITZ // PHOTOS BY: PETER KRAMER // FRAMEGRABS COURTESY OF APPLE TV+



B E C O M E S

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HER

Lisey’s Story, a new limited series on Apple TV + adapted by Stephen King from his 2006 award-winning novel (according to King, his favorite), revels in two elements – darkness and water – both of which are put to stunning thematic use by director Pablo Larraín and director of photography Darius Khondji, ASC, AFC.

The story centers around Lisey (pronounced *Lee-see*) Landon (Julianne Moore), the widow of wildly popular horror/fantasy author Scott Landon, who still dreams about (and grieves) her husband two years after his death. An academic fan of Landon’s, Professor Roger Dashmiel (Ron Cephas Jones), wants Lisey to hand over the author’s unpublished works, and when she refuses, Dashmiel enlists Jimmy Dooley (Dane DeHaan), an obsessed fan of Landon’s who’s willing to resort to violence to obtain the dead author’s manuscript.

Lisey’s memories of her husband, told in flashback, reveal Landon’s troubled childhood with a poor, psychotic father, as well as his connection to a fantastical place, Boo’ya Moon, introduced to him as a child by his dead older brother. Landon, or anyone with an awareness of it, accesses Boo’ya Moon via its connection to water – a large healing pool surrounded by ghostly trapped souls. Visitors to Boo’ya Moon travel through a large Fairy Forest and past “The Long Boy,” a horrible creature made up of lost souls captured over the centuries. Lisey’s sister, Amanda (Joan Allen), visible in this world in a catatonic state, finds herself trapped there, although she is key to Lisey’s attempts to evade Dooley.

Khondji says he was drawn to the project by Larraín (*Exposure*, page 26), whose work he has charted for many years. “And I decided to go on this journey with Pablo,” the cinematographer states. *Lisey’s Story* was shot cross-boarded, on location in early 2020, before moving to Steiner Studios Brooklyn. Production was halted by the pandemic, before resuming in September and wrapping in February 2021. Two-time-Oscar-nominated Production Designer Guy Hendrix Dyas, who has years of fantasy set design experience, says he, in turn, was influenced by Khondji’s early work with Jean-Pierre Jeunet and films like *Delicatessen* and *The City of Lost Children*.

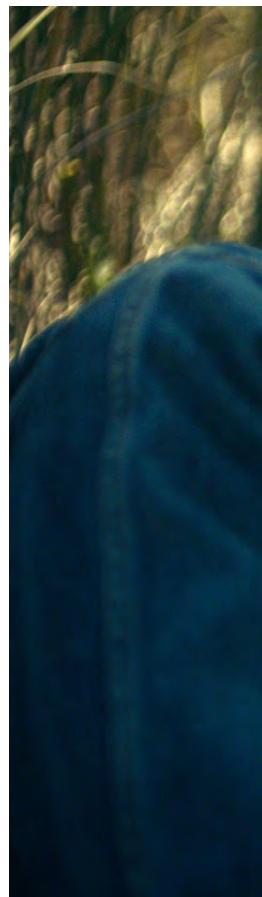
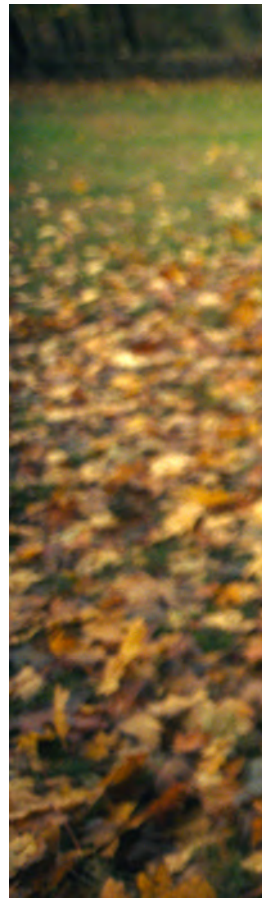
“Their work was inspirational to a generation of art directors and designers,” Dyas shares. “And Pablo, though he doesn’t storyboard, has the complete picture of how he’s going to shoot. He has a plan and sticks to it. Pablo and Darius let you facilitate the storytelling in a creative and collaborative way.”

A team of veteran IATSE crew members surrounded Khondji, including A-Camera/Steadicam Operator Jim McConkey, SOC; 1st AC Chris Silano; B-camera Operator Wylde Bayrón; Chief Lighting Technician Jason Velez and Key Grip Rich Guinness; as well as DIT Gabriel Kolodny. “By my nature, I love tracks,” Khondji adds. “And Jimmy operates the Steadicam like tracks. He’s constantly coming up with interesting ideas. He doesn’t just reproduce things you want – he gives you an extra layer.”

Though Khondji and Larraín briefly discussed shooting the series on film, they opted instead for ALEXA 65, which Khondji used several years back on *The Crowd*, for director Philippe Parreno. “There was only one other DP using it, for some VistaVision shots for VFX for IMAX,” Khondji notes. “It gives me the pleasure of film and of anamorphic. It was strange to propose it for a TV project, but it has a way of seeing both close-ups and landscapes differently, compared to regular Super 35. And the camera, with its large sensor, has lots of definition. But more importantly, it brings a lot of presence for the main character.

“Both Pablo and I wanted a depth in the darkness,” Khondji continues. “I love having the slightest details, allowing the imagination to create more. And [the ALEXA 65] goes deep in the dark, but also, with the sensor’s high dynamic range, can go high in highlights, at the same time.”

While he did employ Panavision Spheros and Leitz THALIA, Khondji’s glass of choice was Tribe7’s Blackwing7 developed by Bradford Young, ASC, and lens technologist Neil Fanthom. As Silano describes: “Darius





"BOTH PABLO AND I WANTED A DEPTH IN THE DARKNESS. I LOVE HAVING THE SLIGHTEST DETAILS, ALLOWING THE IMAGINATION TO CREATE MORE."

DARIUS KHONDJI, ASC, AFC

loves old glass. And [the ALEXA 65] chip is so sharp, you need that vintage glass to smooth things out. The beauty of the Blackwings is that they're modern glass but designed like vintage lenses." The lenses are also tunable, with three different looks, and the "T" (Transition) look, halfway between the "S" (Standard) and "X" (Extreme), was chosen by Khondji.

"The way Pablo likes to frame, he center-punches, to accentuate a character," Silano continues. "His favorite of the set is the 47mm, which spreads out into the corner of the image and invites your vision into the center."

McConkey recalls a funeral scene where Dooley wanders in between mourners in the foreground and the background. "With these lenses, he comes into the shot, and both the foreground and background are super soft, and he's sharp," the operator explains, "like a little slit of reality he passes through."

Silano credits the Preston Light Ranger2 with not only holding focus in dark situations but enabling crew and cast to work without marks. "We can move the camera wherever we want as the actors don't have to be tagged with marks. If an actor throws a glance and doesn't do it every take, the Light Ranger

can catch it." McConkey credits the Wave1 Steadicam Stabilizer as helping to level the cumbersome ALEXA 65. "I have much more brain space to think about composition and timing, without also thinking about 'Is it level?'" he adds. "It pivots on arced races, constantly looking for what you say is whatever you want to be level. And it's instantaneous - it's always level."

To help achieve the series' "deep color palette," Khondji turned to final colorist Damien Vandercruyssen, at Harbor Picture Company in New York, and DIT Gabriel Kolodny, whom the DP calls his "DIA" - Digital Imaging Artist.

Kolodny recounts how Khondji wanted a certain base look "from which I would color-correct." He and Vandercruyssen created a base LUT, bluish in shadows, with slight golden highlights, that Kolodny describes as "very soft, with which I would not be boxed in by something too contrasty." Adds Vandercruyssen: "Gabe likes having a soft curve on the LUT, so he can go quite far in the CDL correction on set." Kolodny worked closely







with Velez to refine the look for individual scenes. “Darius gives you the freedom to improvise,” he continues. “And then Jason would refine the lighting, based on what we were doing, and we’d go back and forth. Darius refers to it as ‘music,’ and that’s what it’s like.”

The look was applied across nearly every key setting, like the Landon home, shot at Bluefield Farm in Blauvelt, NY, and a barn on the same property, the lower level of which was used for Lisey’s office and storage. [The upstairs was unsafe, so a practical set was designed and built at Steiner’s Capsys Stage in Brooklyn.]

“It’s a romanticized version of what we imagined Scott Landon’s study to be like,” Dyas explains, with exposed wood and plenty of detail, including 60 different fake Scott Landon book titles, all in multiple languages. “Our Graphic Design team created covers for those, all with unscripted book titles, whose names we all contributed, and designed in the flavor of Stephen King book covers.” Though, adds Silano: “I looked at them, under the covers – and every one of them was a copy of *The Shining!*”

McConkey says there were “layers upon layers of information” provided by Dyas’s art department, including manufactured writing awards and a turntable/record collection





based on info from a tour King had given Larraín of his writing studio. “You don’t just bang those out,” Silano says of shooting inserts for such items. “You may think it’s just a shot of a turntable, but there was so much discussion. Pablo is a very sensitive artist and knows exactly where he wants the focus.”

Landon’s desk, which sits in front of a large window, became a prime visual motif. “Pablo wanted to be able to see through the window to the world outside at the present moment,” Khondji recalls, “and, at the same time, have this intimate story happening.” Dyas had a large backing made, and even placed trees there, all lit with a big LED push from outside, as well as 10K Molebeams. “Darius is particular about the direction of light, softness and quality,” Velez notes. “He’s very precise and sees differences I might overlook.” Key Grip Guinness would typically place Magic Cloth in front of the LED’s for such shots, ARRI SkyPanels or DMG Lumières (SL1 Mixes or Mini Mixes), the latter his new favorite for nighttime scenes with the Sky Panels turned down to one percent with an ND6 over top.

Vandercruyssen says one challenge was “to stay true to Darius’ desire for a

very dark show, but also wanting to see the actors and not lose any of the action. And because of the amount of latitude I had in the neg, the exposure was perfect to darken some elements. It’s one of the benefits of having HDR with the ALEXA 65 and being able to stretch those out. If it had been shot underlit, you wouldn’t have had the same amount of saturation.”

During one such scene, Jimmy Dooley comes after Lisey using a pair of night-vision goggles in an otherwise pitch-black room. “Those were shot with a cheap handheld camcorder with an infrared mode, bought on Amazon,” describes 2nd AC Troy Sola. “It’s actually from a company called ‘Cleveland Paranormal Supply,’ which lists it as a ghost-hunting camera!” The same camera was used, along with iPhone video, to shoot Dooley’s deranged home videos shot in his bachelor apartment where his obsession with Landon comes full force.

The main visual treat of *Lisey’s Story* is the fantastical Boo’ya Moon, accessed by the characters through the Fairy Forest. Both were enormous sets requiring a complex workflow methodology and creativity from the camera and grip teams. Though the script

simply describes the Boo'ya Moon as "benches" on which the catatonics sit, Dyas worked closely with Larraín to decipher how best to interpret King's singular vision. The designer came up with an amphitheater-like set, rooted in both European/Roman and South American cultures, facing a large pool where Landon comes to be healed. The pool is semicircular, with the rows of seating looking outwards, facing one wall of the stage, the entire set surrounded by green screen for VFX additions of the ocean and other scenery.

Finding a way to film in the unusual set took some thinking. "I scratched my head for a long time and continued to read the script and look at Guy's designs," describes Guinness. "The set was impossible to walk over, severely limiting opportunities for Jim to use his Steadicam. It was just too hazardous."

The solution was three cranes – 75- and 50-foot Technocranes and a 60-foot MovieBird, with Libra heads, all supplied by Monster Remotes. "We were the first job in New York to get the 75-foot Technocrane, which came straight from Czechoslovakia," Guinness recounts of the rig, a beast so large Larraín dubbed it "Medea," which Guinness says "is still labeled on the side of the crane."

The key grip worked closely with Dyas to leave space for the cranes' bases – the 75-footer placed outside the far edge of the pool, allowing it to reach across nearly anywhere on the set. The 50- and 60-foot cranes were placed on the right and left sides, respectively, on 30-by-30-foot rolling platforms, built by Key Rigging Grip Bill Kerwick, which helped to capture

more thoughtful moments from the seated actors. "Usually when you have a 50-foot crane," McConkey reflects, "you know when you're going to hit the end of its reach. With the 75-footer, I could reach across the water, and it never seemed to end. Anything you wanted to do, that crane could reach," including a spectacular move which begins on a closeup of Amanda's face and pulls back, swinging away to reveal the entire Boo'ya Moon world, all in focus.

The camera and grip teams, including dolly grip Joe Belschner, "pickle" operator Michael Buck and Libra head technician Lance Mayer (the latter two from Monster), were, McConkey states, "phenomenal. Joe has such a cinematic understanding of everything. He knows what I'm doing, and I know what he'll do. Between me, him, and Bucky, I still can't believe the stuff we did on cranes."

Velez built a 60-by-60-foot softbox, with 40-by-60-foot frames on either side enclosing SkyPanels covered with Magic Cloth to light the massive Boo'ya Moon set. "It's essentially a wall of light from above," Velez states. Molebeams and 24K Fresnels with golden amber gels provided highlights as well as the beautiful flowing waterfall, itself made orange by painting its base in orange with metallic highlights.

Khondji referenced one of his favorite illustrators, Maxfield Parrish circa 1920s, to create a look for Boo'ya Moon that was rich in blues and gold highlights. "I love putting blue, which Gabe helped me with a lot, and putting gold in the top of the highlight," he shares. "It gave this world a beautiful – yet uncomfortable – feel."





While Boo'ya Moon was built in Steiner's large Stage 3 – and shut down on March 13 until August, when production resumed – the Fairy Forest required an even bigger home. That came in the form of the nearby Agger Fish Warehouse, also in the Brooklyn Navy Yard, a suggestion of Velez's. "It's the only place I ever shot in New York that had 60-foot ceilings," Velez says. Built upon shipping containers and winding from its "Sweetheart Hill" at one end to the other, ostensibly adjoining Boo'ya Moon, it required a map made by Dyas to help Larraín and Khondji plan story moves, which included interactions with The Long Boy.

Velez ordered 350 SkyPanels for Fairy Forest from Insight Equipment. Its color, Khondji notes, was a "very deep blue – different tones of blue, between blue magenta and blue cyan," he explains, still with orange highlights.

The source of the orange highlights in both sets is the ever-present moon – in reality, two practical elements built by Guinness in 12- and 6-foot frames and covered in a printed skin, each lit with a dozen Astera tubes. The larger moon could travel to any point on the set via chain motors, while the smaller one was atop a scissor lift, allowing either to be visible through the trees in the forest or casting a practical reflection in the Boo'ya Moon pool or offering a slight highlight on actors. Khondji says, "We always see a hint of the moon coming through the trees," Khondji notes.

One other fantastical set is the Yum Yum Tree, encountered in flashbacks to the couple's honeymoon – an ice-covered willow tree, under which they sit as Landon reveals his painful childhood. A practical tree was built at the location, across a lake, but a set was built on the Capsys stage, made of huge rings to allow the wax-flocked branch material to rotate. Velez constructed elevated truss rings that circled the tree, and backlit the branches with 10K Fresnels, with ½ blue gels and Chimeras to focus. Guinness notes that "it was tricky to get the lights out of frame, 360 degrees above the set."

Most of the Yum Yum Tree footage was shot by McConkey on the 50-foot Techno, avoiding difficult Steadicam moves over the tree's many roots. "Those were tight moves for Joe and Bucky, but we accomplished them beautifully," McConkey recalls, including a wonderful sweep from the two characters, back out and over the tree itself. Wylda Bayrón says she found herself in waders for the coverage. "One of the rare instances of straight coverage Jim and I did," she notes. The two more typically found themselves "colluding," as McConkey calls it, with Bayrón crafting "mini-masters" instead of common coverage. "It's essentially a single camera show," McConkey adds, "as that's what Pablo likes. So, if there wasn't a good shot for the B-Camera, the second camera dropped, and we'd move on."

According to all involved, *Lisey's Story* is a show that reveals character out of darkness. "For me, it's about the presence of Lisey, who, little by little, comes out and becomes a hero of her own story," Khondji concludes. McConkey calls the ever-present darkness "a veil of reality. What you don't see too clearly can be hidden, and what you do see, you can believe," he shares. "But you don't have to know what you don't know." 🌈



LISEY'S STORY

Apple TV+





LOCAL 600 CREW

Director of Photography
Darius Khondji, ASC, AFC

A-Camera Operator
Jim McConkey, SOC

A-Camera 1st ACs
Chris Silano
Eric Swanek

A-Camera 2nd ACs
Troy Sola
Tyler Swanek

B-Camera Operators
Wylda Bayrón
Zeus Morand
Jeremy Weishaar

B-Camera 1st AC
Olga Abramson

B-Camera 2nd AC
Eddie Goldblatt

DIT
Gabe Kolodny

Loader
Peter Perlman

**Underwater
Director of Photography**
Dave Knox

Hydroflex Underwater Tech
Matt Degreff

Libra Head Tech
Lance Mayer

Still Photographer
Peter Kramer

Publicist
Erin Felentzer



Feature





02



GABRIEL BERISTAIN, ASC, BSC, AMC, CAPTURES NATASHA ROMANOFF'S DYSFUNCTIONAL PAST IN MARVEL'S *BLACK WIDOW*.

BY: KEVIN MARTIN // PHOTOS/FRAMEGRABS COURTESY OF MARVEL/WALT DISNEY PICTURES

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I L Y

FAIR



***Black Widow*, the twenty-fourth entry in the Marvel feature-film franchise, moves forward into Phase Four of the Marvel Cinematic Universe by looking backward – to a time after *Captain America: Civil War* and before *Avengers: Infinity War* and *Avengers: Endgame*. Natasha Romanoff/Black Widow (Scarlett Johansson) embarks on a mission that has her face personal demons in the form of her ersatz family from the Eastern Bloc. They include a pair of other Black Widow assassins (Rachel Weisz and Florence Pugh) and the Russian super-soldier Red Guardian (David Harbour).**

While delivering all the requisite thrills of the Marvel canon, *Black Widow's* aim is often intimate and personal. That's why Marvel President Kevin Feige sought out a director, Cate Shortland, whose résumé was unrelated to superheroes and fantasy. By way of contrast, director of photography Gabriel Beristain, ASC, BSC, AMC, had, in addition to amassing notable feature credits like *Blade II* and *The Spanish Prisoner*, handled additional photography on more than a half-dozen Marvel features and acted as cinematographer for eight episodes of its *Agent Carter* series. For this July *Interview* Issue, ICG contributor Kevin Martin conducted a virtual Q&A with the film's creative principals, including Shortland, Beristain, Visual Effects Supervisor Geoffrey Baumann, 1st AC Danny Ming, DIT Natalie Carr, and Camera Operator Abby Linne (SOC), and Senior finishing artist/supervising colorist Jill Bogdanowicz.

How did you get involved with the project, and how did the visual aesthetic evolve? **Director Cate Shortland:** Marvel seemed to like a German film I made called *Lore*, both for how we shot it and the rawness of the lead character's emotional journey. I think they brought me in to make sure Natasha's epic path felt truthful with how it revealed her suffering and vulnerability. This is a person who doesn't have superpowers, and, in any case, I wanted to look at her first as a woman. You often didn't see her off by herself in the other films, since she was operating in relation to men. We get away from that a little this time, and



she moves and carries herself differently as a result. I wanted to make a film for moviegoers who had never seen a Marvel film. Kevin Feige was on board with this, saying that each film has to function on its own merits. There were elements of *Endgame* that were very important to me when we made this – including, obviously, her death – but we were mainly focused on delivering Natasha as a fully rounded and complex individual, going deeper than had ever even been hinted at in the past films.

Director of Photography Gabriel Beristain:

A lot of my earlier Marvel assignments involved more than just reshooting. A few of those films required shooting over thirty minutes of new scenes, but that is just part of Marvel's way. Being known as "the Marvel guy" kind of worked against me for a while when I was recommended for other films, but I've demonstrated a lot of visual and artistic diversity throughout my career. I waited quite a long time to get to do a whole Marvel feature and was so happy when Cate turned to me. My breadth of experience helped me to understand what she wanted to do and the importance of telling this story that happens to take place in the MCU.

Shortland: I met Gabi on a Monday, and I think he started that same day. In preproduction, well before his coming on, I cut various clips together into some short films: one featured landscapes, another showed children, a third focused on soldiers, and each featured beautiful or evocative shots. I gave those to Gabi so he could see what was inspiring me.

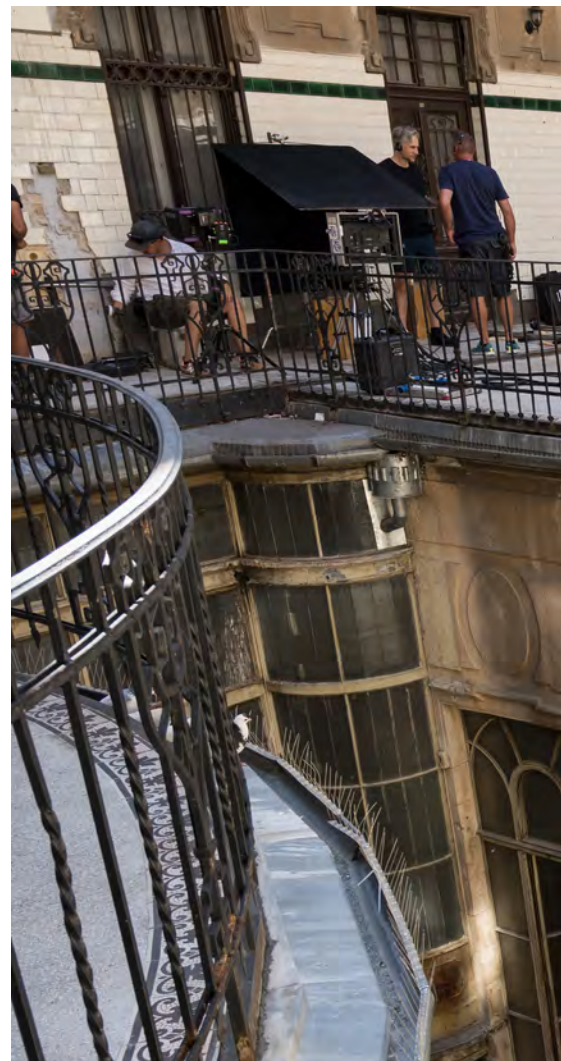
Beristain: As a cinematographer, I sometimes feel that modern films lose the idea of what "film language" is all about. What I love about the Marvel experience is that the whole realm – starting with the comics – is centered on visual storytelling. The artists creating those graphic novels – Steve Ditko, Jack Kirby, Jim Steranko – were doing more than just illustrating, they had an understanding of visual storytelling. Lighting and composition combine to help me create these kinds of visuals, and when you combine those with a good script, that makes for a great Marvel story. With the film, we combine those elements with tremendous acting talents. There are other films where this formula of visuals plus story plus actors doesn't seem to always be remembered and respected. And if one of these aspects prevails over the others, then we are going away from that classic film language.

Shortland: We start the film shooting a lot of handheld, but then as the story changes and she goes back to face the forces of fascism and oppression that marked the years before she joined the Avengers, the camera movement

evolves into a more controlled and regimented way of shooting.

Beristain: Cate worked on the acting and dramatic aspects extensively and with great expertise. And Scarlett said to me: "Don't look after me, Gabi – tell the story, even if my eye bags look big." She didn't want to look glamorous in situations where the lighting was appropriately dark or moody. I shoot with three cameras minimum, every time, and Scarlett loved knowing there'd be coverage for when she gave her great performances. We never tried to inflict ideas on the story that would make everything look the same, like relying on shallow depth-of-field throughout, because in life and out in the world, things always change. Back in the era of celluloid, I always carried multiple stocks with me and often pushed them; that was to allow the versatility to serve the story, so nothing was ever forbidden.

VFX Supervisor Geoffrey Baumann: I tried to get inside Cate's brain early on, to see how her aesthetic and style might differ or go beyond what I've experienced with other filmmakers on MCU shows. Her gritty, realistic take made for a good VFX challenge, setting the bar higher than many past entries. And it pays off because there's a more human connection to the character being developed, and you don't want to do anything that could detract or distract from that focus. Since a lot of this would be done on location and we'd be getting a greater percentage of the work in-camera, we made a conscious and concerted effort to break away from employing huge blue screen walls. Much of our end was extremely plate-based,





"KATE'S GRITTY, REALISTIC TAKE MADE FOR A GOOD VFX CHALLENGE, SETTING THE BAR HIGHER THAN MANY PAST ENTRIES...A GREATER PERCENTAGE OF THE WORK IS IN-CAMERA."

VFX SUPERVISOR GEOFFREY BAUMANN

which meant using Lidar scans and extensive photography for every location. That was true of our stage sets as well – even the ones that VFX wasn't being planned for, since we might need to augment something later.

Like so many big VFX franchise films, *Black Widow* was shot around the world: in the U.K.; Budapest; Morocco; Norway; Atlanta, GA, where Marvel has shot many of their shows; and then Los Angeles. How did the Local 600 team create a successful interface? **1st AC Danny Ming:** Principal photography took place in London, so we had several discussions with the London crew about how the set ran and which set of lenses were used to maintain the continuity of looks, since we were doing pickups from various scenes. We also coordinated to send the glass from London and supplemented that with a camera package from Panavision, Woodland Hills.

Beristain: I have always been a big proponent for ARRI ALEXA, but this time we used the

latest version of the VENICE, which I found very satisfactory. While we were mainly using vintage anamorphics – Panavision C and E-series lenses – spherical Primo 70s, H-series, and Panaspeed primes were used for select IMAX scenes and also on occasions when we couldn't get a wide enough view in anamorphic. In those cases, I'd compensate to soften things. We were fortunate to have a good quantity of matching glass, enough to supply all of our units.

DIT Natalie Carr: My custom-built cart is pretty much a lab on wheels. Having all the camera settings and iris controls, along with live-signal color-grading tools, in the same place made the whole shooting process – with multiple cameras shooting at the same time – extremely efficient, as we had to be very fast and mobile. We installed four Professional 24-inch Sony OLED monitors on my cart to view full-size images from all cameras simultaneously. All monitors were calibrated at prep to make sure what we saw on set matched what the dailies lab colorist would see. To



keep the look throughout the whole movie, we used the same show LUT and only made CDL adjustments based on color reference materials received from our foreign crew. Each day I would export CDL's and reference stills so our dailies operator would apply my grades to the raw footage.

Camera operator Abby Linne: I met Director Cate Shortland when she directed episodes of Showtime's *SMILF*. I loved her first film, *Somersault*, and wanted to impress her. We had similar aesthetic leanings and had a wonderful time working together. When *Black Widow* came to Atlanta and Los Angeles, Cate took the opportunity to introduce me to Gabi, who is such a thoughtful DP. I feel so honored and fortunate that he trusted me to join them for my first adventure in the Marvel world. He and Cate were a wonderful match. Cate would delight in the action and the scale – but she also loves and is very tuned into the emotional details: pulling at cuticles in a moment of insecurity, the crease in a sweaty palm when a character is nervous or the hairs standing up on the back of someone's ears. Gabi would do a great job of delivering big epic shots – cranes, Stabileye, big Steadicam endeavors – but took as much care with those intimate actor moments.

What were some of the more interesting challenges/moments in this show?

Beristain: Cate and I, along with production designer Charles Wood, were clear about the looks we wanted to achieve. Charlie was especially great with the office of the villain Dreykov [Ray Winstone]. There are these shutters on the walls, and they keep moving up and down throughout the scene, while my lights outside were also in motion, with everything controlled and fully repeatable. There was a unique feel to the light in the room, which hints at what the audience does not yet know – the action is taking place 30,000 feet above the ground! We rehearsed these articulated movements and got it all nailed down precisely, so that at important moments, like when we move close to a character, the shutters would open wide to spill more light on him. That set was a big commitment up front, requiring enormous collaboration between departments.

Linne: The cameras are physical and present with the actors and stunt folks a lot, and we often found ourselves in the dirt and the sun on strange terrain or cloaked in fire-resistant hoods so that we could stay close to the action. The most physically challenging scene for me was a series of shots we did in Atlanta. The

camera had to be handheld, but low and at child level, speeding around over tree roots and such. Running handheld at kid-height on terrain is always tough! Danny's focus pulling was usually achieved using the Preston Light Ranger 2 and Preston FIZ system. I am always keeping my eyes out for such useful tools as the Klassen SlingShot that Geoff Haley makes look so good, and the new ZeeGee for mimicking a handheld look off of your Steadicam arm. Shooting fights was one of my favorites. The Taskmaster character is known for mimicking the fighting styles of opponents, so there was a lot of interesting symmetry and call-and-response in both the fight choreography and the photography. It was helpful to think of the most beautiful or signature parts of the choreography as a dance.

Beristain: At one point, Natasha winds up in a house with her old compatriots, which was a stage interior. They arrive late afternoon, with dinner taking place at sunset, and when the enemy arrives, it is night. So there were light transitions covering two hours of the day, ranging from warm sunset to cool dusk, which is offset by the warmer interior lights – mostly tungsten, which I like to use when appropriate, as it brings a pleasant look. When recreating





"I THINK THE FINISHED FILM DELIVERS THE REQUISITE EPIC FEEL, WHILE ALSO REMAINING QUITE INTIMATE AT TIMES."

DIRECTOR CATE SHORTLAND

that set in Los Angeles or Atlanta, these light settings had to be duplicated. I used all sorts of units; sometimes it was like a film from the 1950s, with very directional lights – 10K and 20K units were useful for their power. On location, LED was often very useful, and we used a lot of ARRI fixtures and HMI's (sourced from the U.K. and Atlanta). Gaffer Lee Walters had beautiful [RGB-tunable] sources called "coffins," basically LED cubes that were very soft and came in different sizes, so we could fit them in everywhere, which was useful in our practical locations.

Marvel films are always VFX-centric, and it sounds like the current industry trend toward grounding as much of the effects in-camera as possible made that interface – on set and in post – fairly seamless.

Beristain: I think so. For example, while on location in Budapest, we had a chimney with the characters climbing on it, which was a phenomenal use of practical effects. It featured a mechanical tower, one requiring cranes and stunt harnesses, and we used cablecam to glide across the rooftops. There was a minute amount of green screen, but most of that very powerful scene was done live. The later scenes with Scarlett and Florence and a special stunt unit flying through clouds and explosions were all done at a studio within one of the biggest wind tunnels in the world, surrounded by green screens. We had a robot arm moving with the characters, and we followed the storyboards charting all this out, so we knew what was in sunlight and where the smoke was and when things would pass into shadow. We knew when and where the explosions were going off and would arrange for interactives that tied in. I was monitoring everything from my station, from the movement of the robot arm to the wind-tunnel effects to see how the light was coming.

Linne: VFX is magic, and the Marvel team is a true wonder. We did a lot of watching

previsualization to get a feel for the final, and also listened to Janelle Croshaw, who oversaw VFX for our unit. There was always plenty of measuring and matching, shooting reflective balls, chip charts, and empty plates. Gabi is always thorough, making sure that actors have as many real-life stimuli as possible – firebars, practical lighting, organic camera movement – anything to help the actors to have as much of an authentic grounding as possible.

Baumann: Switching between the various methodologies for the flying is a trick unto itself, what with humans on poles and on wires. One factor is that of actor comfort, so our end doesn't interfere with the performance. Also, I had some of our vendors lean heavily into extensive digi-double builds early, so we'd have options to embellish our shots, especially in those last months, sometimes sprinkling a few soldiers in when needed. In addition to those background figures, we also had digi-doubles for all the main characters.

We ended up with thirteen vendors, though most of the heavy lifting was done by ILM, Weta, and Digital Domain. I divided up the work largely based on my previous experience with each facility – that, and knowledge of the specific strengths each has demonstrated. One other reason we like to use multiple vendors is that near the end of post, after the reshoots, the VFX shot load often increases and we don't want any house to get overloaded. I tried to keep shots and scenes grouped with a single vendor when possible because there's a greater understanding of what is needed when they've got overall responsibility for that series of shots in a single sequence. In one instance, ILM had a sequence that began indoors before the action went outside, and they were able to take on both parts, which worked out well.

Senior Finishing Artist/Supervising Colorist Jill Bogdanowicz: I have worked with Gabi going back to S.W.A.T. It's amazing how fast

technology caught up with the way we had to do things during the pandemic. When we resumed, I was at a theater in North Hollywood, while Cate and Gabi were in theaters on the Disney lot, and we could communicate very securely over a network. It's always better to be able to collaborate in person, but in this instance, they were working in a theater that was properly calibrated, just like mine. We could also broadcast out to people's iPads or TV's; there were several different avenues open to us. I also worked closely with the VFX team. They were able to give me mattes so that if they replaced a background or changed things outside a window, I would have the outline, letting me color-balance either inside or outside that area using DaVinci Resolve. For the HDR pass, we found the image revealed greater color depth, giving us brighter whites, blacker blacks, more detail in fire, and brighter luminosity in skies. The effect conveyed a feeling of 3D without actually working in 3D.

Beristain: We didn't want to ever lose the notion that we were creating this art form within a Marvel film. That's why I believe this film will be unique, adding these qualities to a big, satisfying Marvel movie. Back when the pandemic began, I remember Kevin Feige saying that he was going to hold off on releasing this until it could play on the big screen – because if we didn't, it would be the end of film. [Editor's Note: *Black Widow* was originally scheduled to release May 1, 2020.] So he knows that seeing these films in big cinemas is essential and that a big-screen presentation is part of the storytelling.

Shortland: I think the finished film delivers the requisite epic feel, while also remaining quite intimate at times. We set out to make something fun for the audience that also revealed something raw, real and new about Natasha. I was very fortunate in having so many wonderful collaborators who embraced this vision and helped make that happen. 🌈



LOCAL 600 CREW

LOS ANGELES UNIT

Director of Photography
Gabriel Beristain, ASC

A-Camera Operator/Steadicam
Marcis Cole

A-Camera 1st AC
Dan Ming

A-Camera 2nd AC
Max DeLeo

B-Camera Operator
Raquel Gallego

B-Camera 1st AC
Chris Toll

B-Camera 2nd AC
Roger Spain

C-Camera Operator
Abby Linne, SOC

C-Camera 1st AC
Jacqueline Stahl

C-Camera 2nd AC
Tracy Viera

DIT
Natalie Carr

Loader
Kalli Kouf

Still Photographer
Scott Garfield

Media Manager
Kai Borson-Paine

Media Manager (Additional)
Marshall Hendershot

Utility
Truman Hanks

SPLINTER UNIT

D-Camera Operator/Steadicam
Brian Nordheim

D-Camera 1st AC
Dennis Geraghty

D-Camera 2nd AC
Farisai Kambarami

Utility
Terrell Amezcua

ATLANTA UNIT

Director of Photography
Gabriel Beristain, ASC

A-Camera Operator/Steadicam
Rick Davidson

A-Camera 1st AC
Richard Lacy

A-Camera 2nd AC
Kyler Dennis

A-Camera Utility
Samantha Gardella

B-Camera Operator
Abby Linne, SOC

B-Camera 1st AC
Josh Hancher

B-Camera 2nd AC
Sterling Wiggins

B-Camera Utility
Grayson Guldenschuh

C-Camera Operator
Jeff Crumbley, SOC

C-Camera 1st AC
Ian Campbell

C-Camera 2nd AC
John Metcalfe

C-Camera Utility
Kat Soulagnet

D-Camera 1st AC
Scott Forte

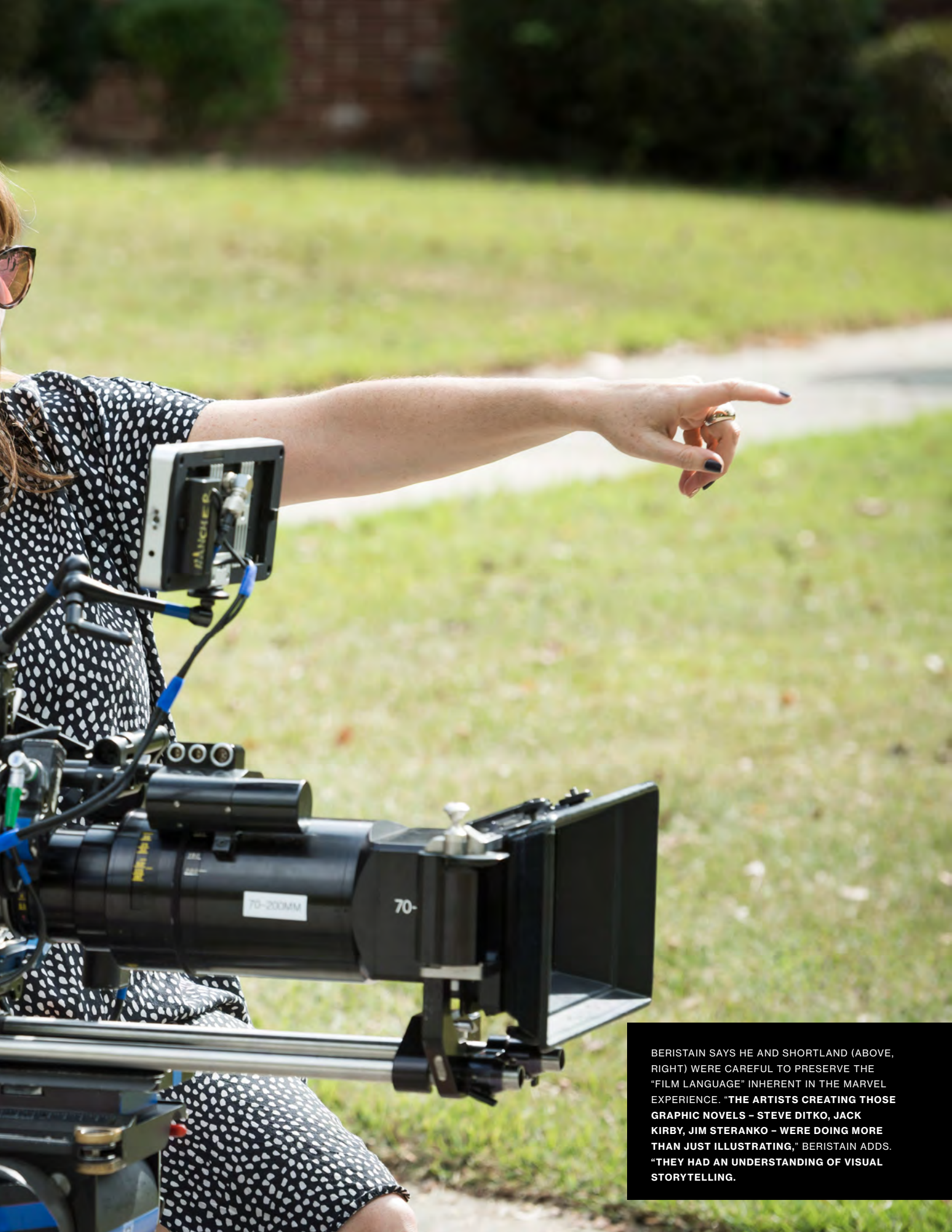
D-Camera 2nd AC
Victoria Warren

D-Camera Utility
Marie Morrell

Array Techs
Josh Cleland
Jamie Pair

DIT RF Tech
Nick Masters

Loader
Lauren Elizabeth Cummings




BERISTAIN SAYS HE AND SHORTLAND (ABOVE, RIGHT) WERE CAREFUL TO PRESERVE THE "FILM LANGUAGE" INHERENT IN THE MARVEL EXPERIENCE. "THE ARTISTS CREATING THOSE GRAPHIC NOVELS - STEVE DITKO, JACK KIRBY, JIM STERANKO - WERE DOING MORE THAN JUST ILLUSTRATING," BERISTAIN ADDS. "THEY HAD AN UNDERSTANDING OF VISUAL STORYTELLING."

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THE INTERVIEW



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Kathryn

Brillhart

Growing up in Maryland, Brillhart caught the photography bug early from her cinematographer father. “When I was eight, he put a camera in my hand and encouraged me to play with it,” she recounts. At 13, he took her to Thailand and the Philippines to shoot a documentary for a non-profit volunteer organization. The next year, he sent her to shoot her own documentary project in the Dominican Republic, with adult team members. Brillhart attended Ithaca College’s Park School of Communications, which issued a 16-mm film camera to each student and guaranteed experience doing their own productions. While there, she also minored in Fine Arts, studying sculpture and collage, which played into her discovery of visual effects. Brillhart’s most recent gig is on the Warner Bros VFX Production team for *Black Adam*.

PHOTOS

BY

ERIKA

DOSS

“NO TWO [VIRTUAL PRODUCTION] WORKFLOWS WILL BE ALIKE. ALL WORK IS BEING DRIVEN BY CREATIVES, AND THAT REQUIRES CUSTOM SOLUTIONS FOR EACH PROJECT.”



What led you to become a virtual production supervisor? My goal was always to be a cinematographer, join the union and follow a more linear path. My first few years were survival. Then I got a job as first AC on *Reign of the Dinosaurs* for the Discovery Channel, and I shot plates that would be composited with the CG dinosaurs. The producer running the animation team on that show was looking for a VFX coordinator, so I took that on, organizing all the information I collected shooting the plates. I met a team of pioneering CG animators – Don Waller, George Wong, Yancy Calzada, and Harry Walton. Talking to all these amazing filmmakers was inspiring, and I started to learn about the relationship between optical and digital VFX and cinematography. It was then I realized I could have multiple skill sets. When I couldn't find DP work, I could tap into VFX and vice versa. Since then, I've often melded the two in my pursuit of cinematography and enjoyed the endless combinations while creating my own opportunities.

What were some formative experiences melding these various career paths? It wasn't easy moving beyond supporting roles. I wanted to find creatives who would not only want to work with me again but also pass my name on to others as a director of photography. It took three or four years of being in Los Angeles before I found other women [cinematographers and directors] who were active in building community and sponsoring each other to be in leadership roles – America Young, Emily Best, Jen McGowan, Tema Staig, Dawn Turner, Elle Schneider, Eve Cohen, Sherri Kauk, Lagueria Davis, Kelly Lohmann, Beth Grant, and Nancy Schreiber, ASC, through groups like Women in Media. Although it wasn't long ago, we didn't have databases to find each other. That's when I realized I wouldn't pursue cinematography in a straight line. I volunteered for the VFX Society, filming their events, and was on the ASC's Motion Imaging Technology Council, where I learned a lot from the virtual produc-


tion subcommittee. My passion for VFX and cinematography was growing, and I saw how, in the future, the dots would connect.

Tell us about some early experiences as a virtual production supervisor. One was with Halon Entertainment, a full-service visualization and previsualization company. I came on board as a producer to work with (Owner) Daniel Gregoire and validate a path for real-time content to play on large, curved LED walls through nDisplay workflows. I added photogrammetry to their pipeline and integrated it into their virtual art department, which I also played a role in building. They only have a real-time pipeline at Halon, so everything they do there is virtual production. Before that I worked at Gentle Giant learning volumetric capture techniques; our team built assets for real-time-playback in-game-engine real-time workflows. Steven Soderbergh's 2019 *The Laundromat* required an Ncam workflow and camera system, as the whole opening sequence was an in-camera effect. After Halon, I joined the production team for USC's Entertainment Technology Center's short R&D film *Ripple Effect*, which was a test case for virtual and remote productions. That was the first production where I held the title of Director of Virtual Production.

What have you learned about the virtual production workflow? No two will be alike! All work is being driven by creatives, and that requires custom solutions for each project. That said, if the focus becomes "What problems do I need to solve?" it starts to become easier to construct a virtual workflow to achieve the desired result. Virtual production touches every aspect of the filmmaking process – volumetric capture, performance capture, in-camera VFX, visualization. So it is important to familiarize yourself with the basic components of each workflow – hardware and software.

Do you have some examples? LED-wall workflows require you to evaluate the level of

photorealism the project requires and strategize toward that goal early on. Some shots may not require as much detail as others, and knowing this well in advance is helpful. Color management plays a large role, and understanding how your images translate from virtual art department to LED wall to camera to post is essential. It is important to design images that work well in 2D and 3D space with strong foreground, midground, and background, taking into account the depth of the virtual world inside the screen and the physical world in front. A few concepts that show up in most workflows that do not involve LED walls are understanding timecode and genlock, tracking metadata, system calibration, and being able to communicate well across disciplines.

You're a mentor for Epic Games' Unreal Engine. What should filmmakers know about this technology? Game engines allow creatives to visualize content and execute unique workflows in real time, much earlier in a production schedule. This, in turn, allows you to streamline the planning and capture phases. A DP and director may use these tools to start visualizing an idea that could then become the first potential draft of their film. The visuals could help get funding for the project, centralize the creative vision with other department heads, and inspire deeper technical planning. Or, the embedded data (if good for final) could be provided directly to the gimbal or Technocrane on set to replicate exact movement. There are endless combinations for these workflows! And anyone can download a game engine globally, which means that more people will have access to this tool. It gives visual-effects artists the ability to render faster at a higher quality than what was once possible on a personal machine and centralizes aspects of their teams' workflows. It strengthens the relationship between physical production and visual effects. I'm excited about the new voices, who otherwise might not be seen or heard, that will come out of this movement. 

Scott Meadows was studying architecture at Texas A&M when he took a course in black and white and then color photography. He was recommended for a visualization program, the VizLab, that accepted 12 students annually. There, with expensive Silicon Graphics workstations and the earliest digital software, the students - half of whom were artists and half of whom were computer scientists - taught and inspired each other. "I came on as an artist but had to write my own ray tracer and technical code," Meadows, head of visualization and virtual production, Digital Domain, recalls. He and many of his fellow students gravitated to the first-ever digital visual effects facilities opening their doors. After earning a Master's degree in visualization, Meadows began to work in traditional visual effects, building cinematics for games and building CG environments. When he moved to Los Angeles, Meadows earned a job as a previsualization artist on *Bad Boys II* and received his first previsualization supervisor credit on *The Chronicles of Narnia: The Voyage of the Dawn Treader*.

PHOTOS BY ERIKA DOSS

Scott Meadows





“AT THE END OF THE DAY, WE’RE MAKING MOVIES. YOU USE WHATEVER TOOLS YOU NEED SO THE CREATIVES CAN FOCUS ON THE STORY AND VISUALIZE IT.”

You’ve been working in visualization for some 20 years. What have been the key advancements? The hardware and software have evolved and gotten less expensive. Motion capture changed from optical capture, which used a lot of expensive gear, to inertial suits with the gyroscopes and accelerometers, which the actors wear. The solution is much more accessible and a fraction of the cost. Then there are game engines. Anyone can download Unreal Engine for free and jump into that. The game engine has become a big component in the real-time process.

What’s the relationship between previsualization, visualization and virtual production? Visualization has had a lot of different flavors. It used to be called “PitchViz” when producers realized that visualization could be used to sell stories. Previsualization would be used to plot out the production, and then there was even postvisualization, where the creatives could plan how the elements would come together after production was over. I stopped calling it “previz” and started just calling it “visualization.” Even with virtual production, that’s what you’re doing: you’re visualizing it. At the end of the day, we’re making movies. You use whatever tools you need so the creatives can focus on the story and visualize it.

What’s your earliest experience with virtual production? Digital Domain was a pioneer in virtual production on 2016’s *The Jungle Book* [ICG Magazine April 2016], a full-on virtual production with all the performances and

cameras live. That was a big turning point. Earlier, I was previsualization supervisor on *Tron: Legacy* (2010), and Digital Domain had just acquired its mocap stage, so it was a new thing. I was able to merge my education and VFX experience into creating a virtual production workflow. As a freelancer, I had my own gear and built my own pipeline and workflow. Then after I joined Digital Domain, I pitched the idea of adding virtual production as a department. That can be challenging in a VFX house, where the pipeline can be very complex and is not real-time. Adding the virtual production workflow was a learning curve, and even painful at times. But game engines like Unity and Unreal, which have been around a very long time and used by filmmakers like George Lucas, are the basis for that pipeline. In their early days, getting assets in and out of the engine was difficult, but Unreal invested a lot in making a very friendly user interface with its own scripting language.

How does a virtual production pipeline differ from a VFX pipeline? The virtual production pipeline is separate from the VFX pipeline because it needs to be portable and flexible. When you’re doing live cameras and performances, it’s like a mini-shoot, with performers in mocap suits, a camera operator, a director. It’s a technical exercise, with Motion Builder for the mocap, the game engine at the heart, and the output usually is Maya. An important part of the pipeline is tracking the data with timecode that’s synced among all the different systems. On the mocap stage, we have a monitor with a “take” number that propagates

through all the data we’re capturing. The performance part is one piece, and the virtual camera on the performance capture might be shot at a different time. Tracking all those layers of data on the day you’re shooting live is an important part of the virtual production pipeline. Then you need to render it out and have a system to track all the changes as well as deliver it to vendors.

Any virtual production proofs of concept that you’re excited about? We did a test for a project where there was an actor in front of a green screen holding a baby doll that was also painted green. We did a live composite, with an actor on the side playing the digital child. Seeing all that composited on our mocap stage with the camera was exciting. It was a run-through of everything you could almost do, minus the LED wall, and that was quite interesting from a creative point of view.

How will virtual production evolve? As the tools improve, there will be more real-time involved in projects. Tracking technology is becoming more affordable and mainstream, mocap and performance capture are merging, and we’re integrating video gaming into our processes. With the evolution of digital humans and virtual production tools and techniques, we’re breaking the mold of how we make movies. Filmmaking will shift from the established “waterfall” approach, where decisions are made at the outset and flow downstream, to a more agile approach allowing creatives to reimagine, iterate and even restructure their projects throughout. 🎮



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MANGLIARINI

BLACK ARCHIVES



Barry "Baz"

Idoine

Director of Photography Barry "Baz" Idoine is best known for his recent work on Seasons 1 and 2 of Disney+'s groundbreaking series *The Mandalorian* [ICG Magazine's Deep Dive]. He won an Emmy for Outstanding Cinematography for a Single-Camera Series for *The Mandalorian*, which liberally relied on virtual production to marry the actors and environments in real time. But that isn't Idoine's only experience in pushing the technology envelope. He was also 2nd Unit Director of Photography (working with Greig Fraser, ASC, ACS) for *Rogue One: A Star Wars Story*, which also made use of a virtual production system, and he used it on the upcoming *Thor: Love and Thunder*, which recently wrapped in Australia. Idoine's other credits include *Vice*, *True Detective*, and *American Sniper*.

PHOTOS

BY

ROBB

ROSENFELD

Can you briefly describe the new technology incorporated into the filming of *The Mandalorian* that was so innovative? Simply put, the walls and ceilings of LED panels created an enveloping lighting environment where all the actors were perfectly lit. And it also provided a photographic background. It enabled us to have a huge amount of flexibility in our shooting locations. Using this technology is efficient and makes the post-production process a lot easier. From a production perspective, it is super helpful.

What's your take on working with LED walls? LED panel technology has been around for about 15 years, used for rear-screen photography. It was a fixed-point perspective, and the pixel pitch of the panels was much bigger, so it was harder to create a final image. But the technology was great for reflections on the windows. I had a lot of experience using it, working with the Los Angeles company 24Frame.com and what they call their "HD Car Projection" service. On *Rogue One*, Greig Fraser and I used LED walls on a larger scale. This time it was a 9-millimeter pixel pitch, which was much better for creating a fantastic lighting environment, and closer to the goal of a small enough pitch for in-camera finals.

What other technologies moved virtual production forward? Real-time camera tracking is an important one. *The Mandalorian* was the first production we used it on, and it allowed us to be immersed in a 3D environment that would change the perspective as the camera moved. We didn't need a single fixed screen, and the camera could move correctly in a 3D environment. It wasn't just about creating accurate lighting – we had a moving parallax perspective. It was an incredibly steep curve to learn what worked and what didn't. We did a massive test a few months before production to concept-proof the technology. Lag from the real-time processing was such that we didn't think we could do dynamic camera moves, and the look of the show didn't have those kinds of moves. But ILM shortened the lag, and by the end of Season 1, we could shoot almost any type of camera move. We learned a massive laundry list on the first day of working in the volume and then refined that in the first season.

Having used the camera-tracking technology on *The Mandalorian*, do you still have a learning curve? What about the role of game engines? I just finished using ILM's Stagecraft Volume technology on *Thor: Love and Thunder*. My learning curve was less steep, but every day I shoot on an LED vol-

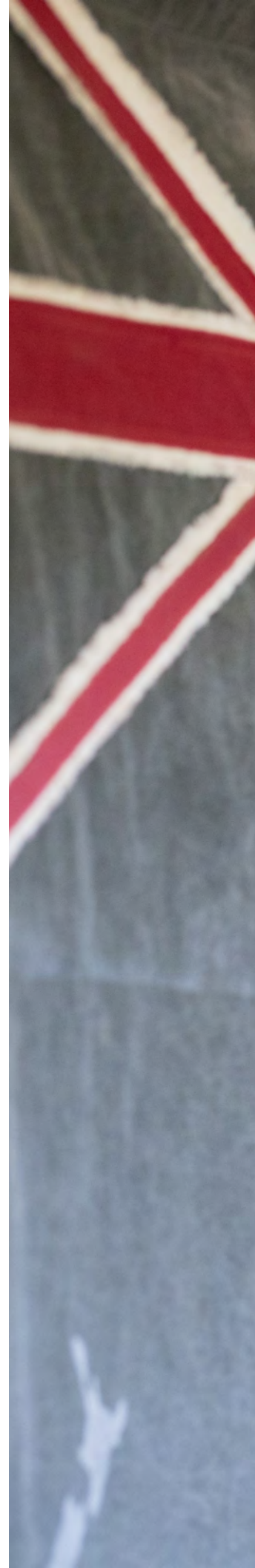
ume, something new comes up. It's still a nascent technology, but I've been lucky to have been partnered with ILM throughout this process. The technical challenges now are minor compared to three years ago. We did a lot of serious testing of game engines and LED panels, and we used the Unreal engine to drive the LED wall in the first season of *The Mandalorian*. In Season 2, we used ILM's game engine, part of their branded Stagecraft technology.

What would you pinpoint as some of the potential problems with virtual production? One is that it's difficult to create hard daylight in a large area, whether it's on stage or whatever area you're shooting on. To light that area and make it look like it's being lit by a single source – the sun – is very hard. You need multiple sources to light that large of an area; there are many machinations of that, but it's a vastly different look from shooting outside. That applies to a virtual volume – hard daylight is hard to achieve. Regarding LED technology, if you illuminate the screens of the dark part of the scenes with the content from the lighter places, you'll get a lowering of the contrast of the image. You have polluted the image, and you won't have an in-camera final image. Those are just two examples of pitfalls. I talk with cinematographers all around the world, and we're all learning more about shooting with LED walls and sharing our experiences.

Any advice for a cinematographer approaching an LED wall for the first time? A major goal in any shot is to integrate the foreground and the background, especially in volume cinematography. Cinematographers need to be involved in the creation of the digital content projected on the LED walls to ensure content that creates a suitable lighting environment and also a photographable background.

Are there any technological advances you'd like to see in virtual production? There are a lot of manufacturers with cheap LED panels hawking themselves for virtual production. We did extensive testing for *The Mandalorian* to come up with a panel with the appropriate refresh rate and good color science. It's important to keep in mind that all these panels are made for big indoor or outdoor billboards, like big screens in sports arenas. If one of the manufacturers comes up with a panel made for cinematography with more appropriate color science, that'll be a game-changer.

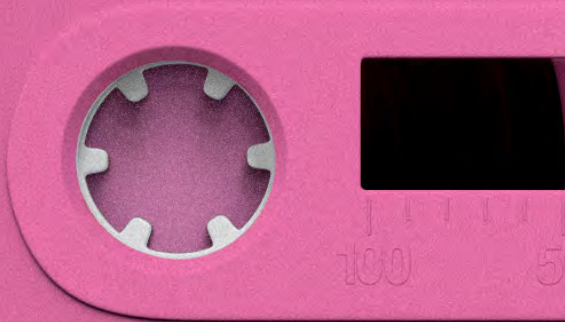
What's the future of virtual production? The sky's the limit! Your imagination is the only weak point in the chain. 🌈





BRIGHT &

SM
Special
Mechanism



BY PAULIN



& SHINY

SIDE
A

E ROGERS

Mark

Ravenhill

Mark Ravenhill, President of German Lighting Products, Inc. (GLP), has a unique outlook on lighting. A graduate of Highbury College of Technology, Ravenhill built his library of knowledge in technical sales. He worked as marketing manager for AC Lighting and product manager/vice president for Martin, specializing in stage, studio, and event lighting. Now, fully responsible for the U.S.-based subsidiary of GLP, he builds marketing strategies and works closely with both the artistic and engineering sides of the industry. His intimate knowledge of today's tools helps both small and large productions develop the best lighting packages for their needs.

PHOTOS

BY

TROY

HARVEY

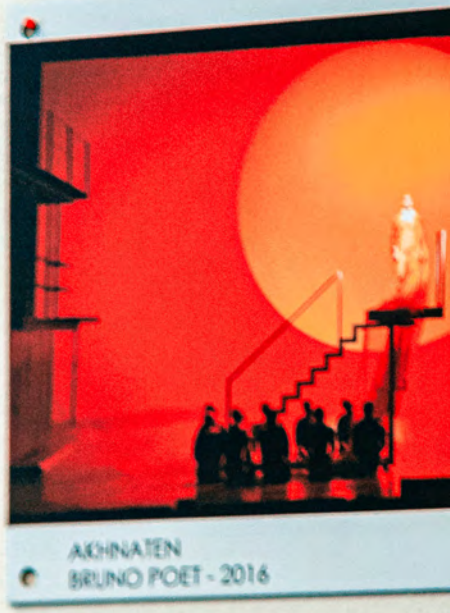




2010



THE 1975
TOMAS FLYWHEEL - 2012



AKHNATEN
BRUNO POET - 2016



2014



LATE NIGHT WITH SETH MEYERS
KATHLEEN DOBBINS - 2014



When did LED lighting first make its mark on the industry? It was in the early-to-mid 2000's that LED-based products started to appear on the market. It was predominantly static fixtures, discrete LED's, where each LED was a single color. To get different options for mixing colors, it meant the face of the fixtures looked like a bag of Skittles. It wasn't long before automated fixtures from different companies came on, and the push for innovations and better technical characteristics moved things forward. It's gone at a pretty fast pace ever since.

What are the things that you need to look out for when buying LED-based sources? There are many indexes now – CRI CQS, TLCI, TMS-30. But it's still best to get your eye on a fixture and measure with equipment you're comfortable with. Any manufacturer or distributor should be happy to get you set up with demo fixtures. Advancements in technology continue to move at quite a pace, so it is also worth making sure that you see the latest units available, which may incorporate improved color systems or other practical benefits such as lower weight or smaller size.

What's key to know about LED fixtures as they begin to dominate set design in live, televised, and theatrical productions? Consistency in output and color. If you find yourself needing to add a set piece, you'll want to make sure that a dialed-in red gives you the same color and intensity as what you had before. It's worth choosing supply partners and vendors who have experience and are on the ground for you. Sure, you can go to Amazon and buy all the LED tape that you like – at a cheaper price – but you'll have the hassle of the import and possible tariffs that need paying, and then if something isn't right, it's a lot of calls or email to fix it.

Is the industry comfortable enough with LED's that there's a move toward customization? From a manufacturer's standpoint, I can say that we always get excited when someone approaches us with a need for a custom solution. On many occasions, this has led to that innovation becoming a part of a feature set built into mainstream fixtures. With LED sources getting smaller, they can be incorporated into so many projects. We've made giant honeycomb sets, lit a working miniature Ferris wheel, made giant flowers as a set surround for a DJ at a festival, and created a bunch of album cover artwork for set pieces at record launches and tours. Bring the idea, and there's a way to make it happen.

Is the relationship between LED lighting and camera/lens more important today? With the possible exception of theater and opera productions, every live entertainment performance sees a camera lens at some point. Of course, this covers film and television, but every corporate event or big product launch always goes through a camera lens to get projected onto large screens at the side of the stage. How many times have you been to a concert and seen most of the audience with their phones in their hands taking photos or recordings with this

material destined for social media channels within a few hours of the performance ending? It is certainly worth educating every student and practitioner of lighting, no matter what their chosen discipline, that understanding the way the camera sees the light and then lighting for it is an important part of what they need to be doing.

What are some of the key elements of how LED lighting "reads" through different lenses and ultimately on the monitor? If LED is to be an important part of your lighting, then it is always worth doing a camera test ahead of time to identify any potential issues. Getting the Pulse Width Modulation (PWM) frequency in sync with the camera electronics is important. Newer fixtures have greater control over this, but there can be payoffs with low-end dimming becoming significantly more "steppy" as PWM increases, so it is often a combination of things that need to be checked. 🎨

“THERE ARE MANY INDEXES – CRI CQS, TLCI, TMS-30. BUT IT'S STILL BEST TO GET YOUR EYE ON A FIXTURE AND MEASURE WITH EQUIPMENT YOU'RE COMFORTABLE WITH.”



If you're a fan of Sia, you no doubt were entranced with her feature film debut, *Music*. And you can thank Lighting Designer/Chief Lighting Technician Matt Ardine for the visual lighting dance that kept viewers engaged. The Los Angeles-based IATSE Local 728 member has been doing commercials, features, and broadcast concerts for at least 15 years. His distinct creativity can be seen in spots like the 2018 Kia Christmas Commercial and in more than 100 broadcast concerts for iHeartRadio, including the 2020 iHeartRadio Music Festival. He's also designed dance and concert scenes for movies such as *The High Note* and *Music*. At the moment, he's gaffing STARZ Network's *Gaslit*, where his fellow Emerson College cohort and Local 600 member, Larkin Seiple, is the cinematographer.

Matthew

PHOTOS

BY

TROY

HARVEY

Ardine



“...A FULLY
CONTROLLABLE
LIGHTING RIG, WITH A
GOOD PROGRAMMER,
ALLOWS THE DP TO
PAINT THE SET IN REAL
TIME, TRANSFORMING
THE SPACE WITH A
PUSH OF A BUTTON.”

What are the advantages of LED's today? For me, the advantages are built-in dimming without color shift, less power consumption, low-profile soft sources, less heat, and battery operation. But the major advantage is color manipulation. The LED lights that have come out in the past couple of years are just starting to show the modern way to manipulate color. My preferred method is to control the lights using hue, saturation, and color temperature, but many of my colleagues also love to use XY color control. This abstraction from directly controlling each of the colored emitters standardizes the color. When a light has eight different colors (such as the ETC Source 4 Series 3), there are a hundred different ways to create a 3200K correlated color temperature.

What are the current shortcomings? Light output and weight. Even in these days where we can shoot 3200 ISO at a T1.3, there are many situations where we are balancing to existing sunlight that is coming in the room at over 300 foot-candles. Sufficient output is still an issue in some situations. To get more output, manufacturers are using heat sinks to cool the emitter array, which is causing lights to get very heavy. Heavy lights are limited in their use because they require extensive rigging that a lot of locations won't accommodate.

How important is pixel control, and how does it change what you do? Pixel control is the ability to break a single light up into several control areas. For example, the LiteGear LiteMat Spectrum 4 has a mode where you can break the light into four individual sections. This opens up some possibilities. The first is to do a TV or fire effect; you only need one light because each of the pixels can be doing its own dimmer and color effect. Second, when you place them as an overhead with several of them lined up, you can pick a small section to turn on or create a gradient from key side to fill side.

Is there a shift in how you approach LED's? The push towards LED has created two huge changes in the lighting department. First, the lighting programmer is now a big part of the creative process. A good programmer needs the technical know-how to operate the console, understand color manipulation, and have a cinematic eye. The combination of a fully controllable lighting rig with a good programmer allows the DP to paint the set in real time with the ability to completely transform the space with a push of a button. The second shift is the creation of large lighting control networks. The shift in the rigging electric department has gone from putting down large amounts of power to installing incredibly complicated ethernet networks. A typical TV show might be around 10,000 channels of control, and I've done sets up to 180,000 DMX channels. Pushing this data around the set requires set lighting technicians to have a large amount of IT knowledge.

Is Tungsten still the “gold standard”? Choosing LED lighting is similar to picking a lens set; it has innate characteristics that will contribute to the look. Some LED lights are known to over-saturate skin tone, according to the TM-30 standard. They meter 120 percent saturation when using the Sekonic C-800 color meter with the light set to 3200K. Even though numerically, this is awful, many DP's love the look of skin tones that this over-saturation creates. I don't think there is a way to rate a light's color as good or bad. There are several standards that are trying to give an empirical number to how “good” a light's color rendition is. These include CRI, TM-30, SSI. It seems that most manufacturers are trying to get their light, at 3200K correlated color temperature, to match the spectral curve of Tungsten. Maybe Tungsten isn't the gold standard for every show. Each light is going to create a different spectrum, with different levels of saturation or hue shifting, which could work with or against the style the DP is trying to achieve. So picking a LED light should be a creative decision based on its spectrum instead of always going by the numbers as to what's “good.” 🌈





Al

DeMayo

A working member of IATSE Local 728, Al DeMayo began his career as a lighting technician on commercials, music videos and features. In the 1990s, DeMayo and his partner, Claudio Miranda, ASC, formed a small lighting company eventually sold to Mole Richardson. DeMayo stayed on, becoming director of product development. In 2006, DeMayo, Rigging Gaffer Jeff Soderberg, and Chief Lighting Technician Mike Bauman formed LiteGear Inc., an early pioneer of ultra-thin and flexible LED lighting products. In addition to serving as chairman of the board at LiteGear, DeMayo leads mobile app development for TechScout Systems, is an active chief lighting technician, and is an associate member of the ASC.

PHOTOS

BY

TOBIN

YELLAND

As vice-chair of the Solid-State Lighting Subcommittee of the Motion Imaging Technical Council (MITC) at the ASC, you are in the perfect position to look to the future.

What is the committee looking at? Color science. Our goal is to recommend best practices for measuring and quantifying light for cinema. The challenge is the use of four or more colored LED's to achieve the desired result. When you are color-mixing three colors, such as RGB, the results are much simpler to predict through triangulation. Add a fourth, and now metamerism comes into play. Metamerism is a perceived matching of colors with different (nonmatching) color combinations. These differences are why different manufacturers' white light output often varies even at the same CCT. So, how do we properly define cinematic white light along the Planckian curve and consider plus/minus green shades? We're working on it.

What are the pluses of using LED's today?

The story is about the use of microprocessor devices to control light. Today, an LED, which is simply a semiconductor that, when powered, emits a photon (light), is the easy part. LED's are one-thing-well devices that emit a single-color, at a single level of brightness, full output. This leads to the single most important characteristic of LED's – the ability to be switched on and off at blazingly fast speeds. The most common switching process alternates an LED between completely off and on, in a pattern that results in perceived dimming. Switching the LED on half of the time and off the other will result in the output appearing to be continuous at half the maximum brightness or 50 percent. Because the LED is never dimmed the way other technologies are, the output color appears unchanged at every level of brightness.

With the advantages being...? Well, using precise control of each color combined with scientific methods of color mixing and good old filmmaking techniques allows for any color and any brightness light fixtures to be reliably used on film sets worldwide. Another major plus is the ability to easily make arrays of nearly any shape. What we call an LED is an LED package often containing just one LED chip. RGB LED's are single packages with multiple chips in red, green and blue. White LED's are blue chips with an applied phosphor that converts blue light to white. Luckily, the LED packages we use have a nice and smooth output field, often with a great tapered edge that is free from color shift.

What should filmmakers new to LED watch out for or learn about? All multi-color light fixtures are not created equal. When white light is desired from a multi-color fixture, be sure that the color processing is done in the fixture, and don't rely on the DMX console.

White light for cinema camera capture is very particular, especially when cast upon actors with varying skin tones. Each manufacturer uses advanced processes to achieve the best possible white light color, and, in my experience, console-level color mixing doesn't always meet expectations.

Any examples? ARRI's SkyPanel uses red, green, blue and white emitters. ARRI did the color science; the console provides the interface. Other RGBW fixtures that rely on off-board color-mixing techniques fall short of cinematic acceptability. Consumer-level LED controllers can also be a problem. They flash on and off in a pattern that appears continuous at the desired brightness. But the camera is not a continuous capture device, as it, too, strobes. This is where economical LED dimmers and controllers can cause problems on set.

So using consumer gear on set in a reliable fashion is a challenge?

Definitely. Taking into account the camera's frame rate, shutter angle, and rolling shutter, as the pulsing LED must not conflict with the sensor of the camera. It's best to do an iPhone camera test when selecting. Dim the LED ribbon or bulb down and use the camera app to capture the light hitting a nearby surface. Set your camera to its fastest frame rate, and try to adjust to the app's exposure while looking for any rolling bars or strange patterns.

What have you learned in the field that will fuel the next generation of lighting development?

Anywhere pan-and-tilt adjustment. To adjust an older fixture back in the day, we had to get a ladder and apply a series of techniques to get it just right. Adjust the flood/spot, add a scrim, adjust doors, add a snoot, pan/tilt, or add gel filters. We've addressed some of these needs. But adding simple tilt-up or pan-left abilities would be quite welcome. Also, there are still no LED options for large HMI applications (9K, 12K, 18K). Considering all the benefits of LED over older technology, I think that an any-color and any-brightness "big gun" would be highly valued.

What are some of the unique ways LED's are being used that change how we light?

Volumetric sets using LED walls everywhere are a game-changer for in-camera backgrounds. Virtual sets are easily created and manipulated. However, they fall short when that light falls onto real-life subjects such as actors, set elements, and props. This is where the opportunity to integrate cinematic lighting into the virtual production space exists. The main issue is that red, green, and blue light from the video wall is limited in the ability to accurately simulate the full-spectrum white light required by the camera. When the

“...THE SINGLE MOST IMPORTANT CHARACTERISTIC OF LED'S IS THEIR ABILITY TO BE SWITCHED ON AND OFF AT BLAZINGLY FAST SPEEDS.”

video wall is in frame and being captured directly by the camera, all appears acceptable. When light falls on a subject, such as their skin tones, the deficiencies in the color spectrum are revealed.

So is there a preferred way to light for virtual production?

Using modern cinematic light fixtures, with advanced color science to accurately simulate full-spectrum light and installing cinema lighting fixtures into virtual sets outside of the camera's field-of-view, seems to be the preferred method for virtual production. Taking things one step further, companies like Disguise are offering the ability to insert these IRL ("in real life") cinema light fixtures into 3D space and even send the RGB video signal along with it. At LiteGear, we interpret the simple RGB signal into a full-spectrum and cinematic white light that remains adjustable to the camera's white-balance settings. The result looks like the actor is fully engulfed in the 3D environment while maintaining proper and accurate white points for the camera. It's pretty cool to see. 🎨



A

SIDE

8K and



DD DOLBY SYSTEM[®]

BY PAULIN

BEYOND

C60

Low Noise



E ROGERS

*Compact
Cassette*



Markus

Förderer

Director of Photography Markus Förderer, ASC, BVK, was selected as one of *Variety's* 2019 ten stars behind the camera, becoming one of the youngest members of the ASC. *Hell* marked his feature debut, earning him several awards, including Best Cinematography Debut at Camerimage. He's won awards for Director Mike Cahill's *I Origins* (Sundance) and Janna Ji Wonders' *I Remember* (German Camera Award). He's collaborated with Roland Emmerich on *Stonewall* and *Independence Day: Resurgence*. Recently he's begun shooting 8K for *Rise, Bliss*, and *Red Notice* (RED MONSTRO with Panavision large-format Ultra Panatar lenses).

PHOTOS

BY

RICHARD

DuCREE

What was your first project shooting with an 8K sensor? The pilot for *Rise*. The delivery format was only 1080p ProRes, but I used the 8K RED HELIUM camera to its advantage. The higher native resolution of the sensor allowed me to rate the camera at a wide ASA range up to 3200 ASA. Since the noise on an 8K is so small, it visually disappears when down-sampled to 2K. This all happened in real time, in camera. The result was a pristine 1080p ProRes file that worked for the network's deliverable, and the high ASA rating allowed me to shoot on location in various lighting conditions. The native 8K also allowed me to switch to different sensor readout modes, cropping in the field of view on the same lens. This was a big time saver since I could keep shooting in intimate scenes without swapping a lens. When I wanted to go tighter, I could simply switch to the 6K or 4K crop mode on the camera, resulting in a tighter shot without swapping lenses.

What cameras can handle true 8K? The number of cameras that tick all the boxes to be considered for the primary A-camera is still limited: RED MONSTRO DSMC2 and RANGER, RED HELIUM, and Panavision DXL. The Panavision has the benefit of many integrated features and seamless compatibility with Panavision lenses. Most recently, there are mirrorless still cameras that are capable of shooting 8K, like the Sony Alpha 1 and the Canon EOS R5. These are specialized cameras that can complement other studio cameras. However, it's important to consider the color and recording workflow and not just the resolution. A lower-resolution 6K KOMODO can be easier matched to 8K RED cameras. Despite the lower resolution, the same color pipeline and similar image characteristics make mixing seamless. Blackmagic Design offers the highest-resolution sensor at the moment. With a 12K sensor, the URSA Mini Pro offers a very streamlined workflow. Despite the high resolution, the files can be compressed without visually noticeable downsides and work in real time in Blackmagic's DaVinci Resolve.

What do you need to consider when looking at shooting 8K? It is important to consider all aspects of a camera and not purely look at the resolution. Dynamic range, color, recording format, compression, and the form factor, size, and weight each play an important role and can be different from project to project. Some of the cameras mentioned above are designed to work with Super 35 lenses, others with full-frame lenses. A smaller sensor can be beneficial when shooting in low light conditions with fast lenses to maintain a usable depth-of-field. Larger sensors tend to introduce less noise and can be the right choice if a shallow depth-of-field is delivered. As the consumer displays catch up and more affordable 8K TV's come to the market, filmmakers can have cameras available that can capture at a higher resolution than the distribution format. This gives flexibility in post for VFX work and re-framing. A lot can change during the editorial process, making it necessary for some shots to be cropped to work in a different

context than initially planned. As a cinematographer, it is in my best interest to capture sufficient resolution to allow for this without showing visual degradation, since upscaling of lower resolution material will magnify digital artifacts or require artificial sharpening that is very unpleasant.

What are some of the challenges of 8K? Producers can be scared of 8K, assuming that the data rate and storage requirement are astronomical, but this is not necessarily the case. Depending on which camera and capture format is chosen, a slightly compressed image can have a similar data footprint as an uncompressed RAW file of lower resolution. However, it is important to keep data and the resulting cost during postproduction in mind when shooting. Some directors of the digital age are not used to cutting in between takes anymore. I try to treat an 8K shoot similar to shooting on film, where everyone is a bit more disciplined and conscious of the camera rolling. Making sure the post house and VFX vendors don't cut corners when working with high-resolution RAW files is also important. It can happen that the debayering is not set to full resolution. Even for 4K or 2K delivery, it is crucial to debayer at full 8K resolution first and then down-sample to the delivery resolution. The render times are longer, but the image looks smooth and natural. 🌈

“EVEN FOR 4K OR 2K DELIVERY, IT’S CRUCIAL TO DEBAYER AT FULL 8K RESOLUTION FIRST AND THEN DOWN-SAMPLE TO THE DELIVERY RESOLUTION.”



Chris

Chinnock

Chris Chinnock is the President of Insight Media, a consultancy focused on advanced imaging and display technologies. In 2018 Chinnock realized that 8K was becoming a major player in displays and that production and distribution would soon follow. As a result, he formed the 8K Association, an industry trade organization focused on documenting, advocating for, and influencing the advancement of the 8K ecosystem.

PHOTOS

BY

PAUL

SCHIRALDI



Tell us a bit about the 8K Association. The 8K Association was launched at CES 2019 with five key panels and TV-makers. It has grown to 29 industry players spanning the range from content creation and production to distribution and display. We have active workgroups working on updating our 8K TV Certification program, groups working on producing educational seminars and use-case information, and a committee focused on solving the encoding-decoding challenge for distributing 8K content.

What are the first things that you have to think about when you are considering 8K production? There are both technical and aesthetic issues to consider. Technically, you have more pixels to play with and an extended dynamic range. This creates more flexibility in how content can be created. For example, it is well known that capturing at 8K and finishing at 4K produces a better image than capturing and finishing at 4K. Another benefit is the bigger canvas that 8K offers, which can enable pan/scan/zoom and crop with no loss in deliverable quality. You also get a better imager for archiving and future-proofing.

What do filmmakers need to know before deciding? A director has to be comfortable with the technology and confident that he can get the look he wants. 8K files are bigger, so the cinematographer and the crew need to understand any recording time limitations, storage issues, and dailies production workflows upfront. Camera tests with lenses are also needed to consider the aesthetic of the content. Lens options are critical, and there aren't a lot of lenses that can fully resolve 8K content to the edge of the sensor. You might have a favorite legacy lens, but it might be better for 4K. Not everyone wants a crystal-clear sharp image. If you want softness and lens flare, that might be a valid reason not to shoot 8K. However, there is a flip side: you can add softness and flare as needed in post-production. Again, 8K capture gives you more flexibility.

What are the downsides? The files are bigger, and you are dealing with much more bandwidth. You need to consider whether you have the right software and workflow. There is a little more storage and cost, but the tools are all there. While the benefits of capture and production in 8K are becoming more accepted, there is still some pushback in finishing in 8K for archiving or delivery to consumers. We believe major streamers will eventually offer 8K options for content, but it will require a critical mass of 8K TV's and cost-effective distribution options.

Sony is working on capturing and broadcasting the upcoming Tokyo Olympics in 8K. What are the issues they are trying to resolve? Unfortunately, there remains some uncertainty as to whether the 2020 Olympics will proceed due to rising COVID cases in Japan and domestic pushback. However, people should know that NHK has been broadcasting 8K content since December 2018, so they have a lot of familiarity with non-live production. Stepping up to a full program of live 8K content will likely be a bit of a challenge, but I suspect it will be well-handled. I know Sony is doing its part to ensure a smooth broadcast.

What are the workflow options available today? There are many workflow options depending on what type of content you want to capture. The key point to make here is that the 8K workflows are very similar to 4K workflows. Similar equipment, software, and control surfaces are used; there is just more data and ramifications.

How does 8K impact the DIT and the colorist? For the most part, the job of the DIT or colorist remains essentially the same when working with 8K content. In reality, they are likely to work with a 4K proxy where the original camera files are stored locally, in networked accessed storage, or in the cloud. The big difference will be having an 8K display on hand to quality-check on that device.

Where are we with monitoring on set or in the DI? There are no 8K reference monitors available yet. Dell does make a 32-inch monitor that can be used for editing but not reference grading. The feedback we have received so far is that a reference-grade monitor needs to be at least 40 inches diagonal and maybe a bit bigger. Specifications are still in development, but full DCI-P3 color performance, very low dark levels, and full-screen white luminance of 1000 nits or higher seem like a good starting point for discussion.

Where is 8K going in the next five to 10 years? We've already seen several resolution transitions in the media and entertainment industry – from film to 1080P to 2K to 4K. These have typically been led by the camera makers and the display makers, which is happening again with 8K. Other parts of the ecosystem adopt the new resolution at different rates. Broadcast is the slowest, with over-the-top streaming being a relatively fast adopter. We see this pattern repeating with 8K. 🌈





**...THE BIGGER
CANVAS 8K
OFFERS CAN
ENABLE PAN/SCAN/
ZOOM AND CROP
WITH NO LOSS
IN DELIVERABLE
QUALITY.”**

Bruce

Markoe

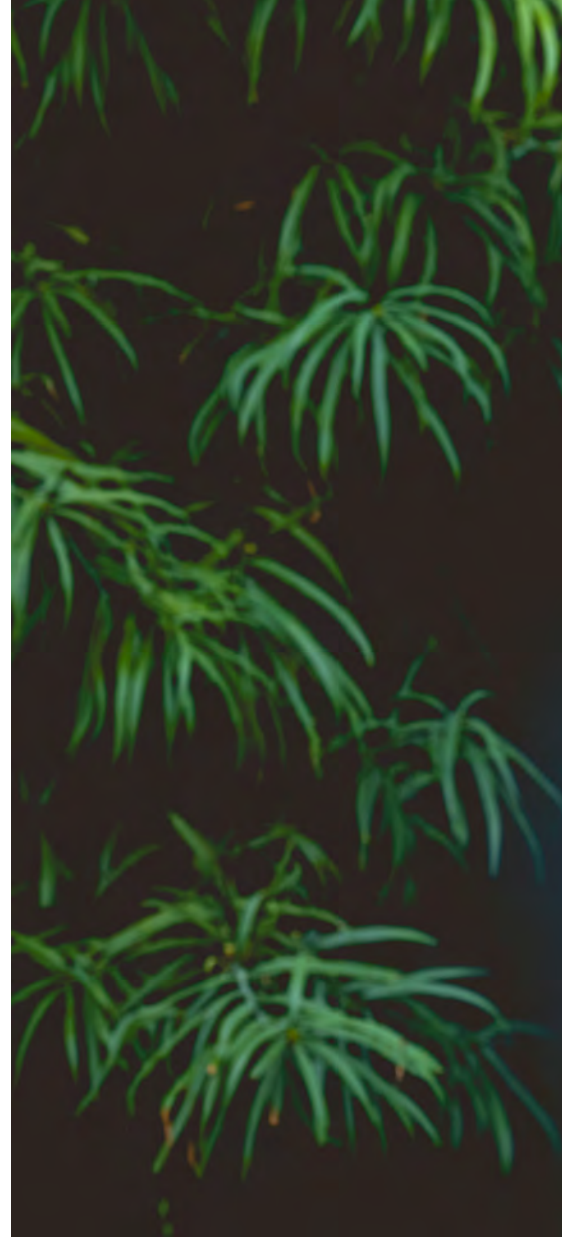
Bruce Markoe serves as Senior Vice President of Post Production/Operations and DMR for IMAX Corp. He works closely with filmmakers to utilize IMAX cameras and new technologies to optimize and produce their movies for the immersive IMAX theatrical and home formats. Before joining the company, Markoe ran postproduction at Marvel Studios, Overture Films, Revolution Studios, MGM Studios, George Lucas' Skywalker Sound South, and JHD Sound.

PHOTO

BY

TOBIN

YELLAND



What's the best reason for filmmakers to consider IMAX? IMAX theaters are consistent in their design and equipment, as everything is done in-house. Our projectors are proprietary, as is our sound system. We have higher brightness and contrast. We calibrate all our theaters every day and have additional post technologies (DMR) to ensure the best image. This is now all interactive, so the filmmakers are in complete control of how the IMAX version looks and sounds. Because our screens are 50 percent larger on average than non-IMAX cinema screens, you do get a more immersive and unique experience.

Why do some filmmakers want the IMAX version of the movie to be the "hero" version of their film? Many want to create an exclusive approach to how they make the movie for us. On the new James Bond film, cinematographer Linus Sandgren [ASC, FSF], and director Cary Fukunaga shot selected se-

quences with our IMAX 15/65mm film camera. This was a first on a Bond film, and sequences were truly planned out to be shot on this large format with our expanded aspect ratio. The look and format excited the filmmaking team. When you know you have something special and plan for it, you take full advantage of its capabilities. Their only wish was that they could have shot more with the cameras, but we were limited on stock as *Tenet* was shooting at the same time.

What are the limits of larger resolutions/formats from an IMAX perspective? The cameras are unique in format but can still be used under most filming conditions. The biggest limit is probably noise and weight. For close-up dialogue scenes, due to the size of the film frame in 65mm, the film is flying through the camera magazine and is thus audible. We have blimps that help, but in very quiet situations you still hear them, so looping most like-

ly will be needed. Although heavy and large, you can still hand-hold. Hoyte van Hoytema is amazing at doing action sequences hand-held. There are always unique challenges on any big movie, and our camera department is great at working to solve them and even build and create new accessories and tools.

What challenges do filmmakers need to be aware of when considering IMAX? As with shooting any film format, you need to give Kodak enough time to ensure they have the 65mm stock you will need. Typical film shows shoot far less than digital shows, but that's up to the filmmaker. You have to remember that IMAX film loads only run three minutes long due to the frame size, but the crews are very fast at magazine changes once they do a few. No delays. Unique shooting requirements must be discussed with us to ensure the cameras are prepped properly and any custom accessories are built and tested.



The IMAX system draws a lot of power, so using a long power cable for battery runs on a big crane needs to be planned. At first, on *WW84* [ICG Magazine October 2020], this was a concern. Once we became aware, it was quickly remedied by building a special battery.

What do filmmakers need to know about blending IMAX footage with 35mm? One of the most important things is to test and review in an IMAX theater. A very important part of our “Filmed in IMAX” program speaks to this. When reviewing in IMAX for cameras and lenses, you can clearly see how they compare and what attributes may not “cut” together well. Then you can make adjustments to how you may shoot or what cameras and lenses you may use to make this work. It is common to use multiple camera types on movies, and this step makes a big difference.

How was *Tenet* a perfect example of the best use of IMAX? The film sections of *Tenet* were shot in IMAX and scanned at 8K resolution. The movie was finished in 6K resolution and then mastered for the home in both 4K and HD. So, when you watch that HD version now on a 4K or 8K TV, you can see the increase in detail and resolution when the IMAX footage is playing. And this is compared to the rest of the film, which was shot in five-perf 65mm. That should be all you need to know about how and why oversampling does work when you have higher quality capture resolutions.

Where do you think 8K is today? It’s not really available in theaters except for a couple of very large LED screen wall installations. And I don’t think it will be for several years due to the continued high cost and other factors. Our current laser 4K projection technology is quite amazing, and we have screens that go up to 110 feet wide. But 8K is some-

thing that is now in the home and continuing to roll out. So, the idea is why not shoot and project for the highest possible resolution since cameras are now 8K and higher. Yes, it costs more, but when spending so much money on movies, it seems short-sighted to not at least master in 8K even though you may only release in 4K and stream in 4K. YouTube already has an 8K streaming channel, and I believe you will see other platforms come to market as new 8K codecs are adopted, enabling compressed 8K streaming to the home. Having that “mastered in 8K” version in your pocket is something that can be monetized both now and a long way in the future without the need to circle back and redo everything. And shooting and mastering in 8K, and down-sampling to 4K or even 2K, still shows benefits if projecting in 4K. We see it every day on our screens when we test and review. There is a benefit to doing this now if you can make it happen. 🌈



INDIEGROUND

VIRTUAL TAB

A
SIDE

BY PAULIN
ICG REC

LE SETTERS


E60

ULTRA
CHROME

THE ROGERS

CORDS

STEREO

 DOLBY SYSTEM[®]

Martin

Ruhe

Martin Ruhe, ASC, first garnered attention when Joe Leydon of *Variety* said, "The moody lensing by Martin Ruhe [on Toronto International Film Festival premiere *Harry Brown*, starring Michael Caine] vividly conveys the no-hope squalor of a contemporary urban wasteland." Ruhe, who was born in Germany, received the British Independent Film Award and Golden Frog at Camerimage for *Control* and an ASC Award for *Page Eight*. His long-time collaboration with George Clooney includes *The American*; Hulu's *Catch 22* (with episodes directed by Clooney, Grant Heslov, and Ellen Kuras, ASC), for which he received an ASC Award; and Netflix's *The Midnight Sky* (directed by Clooney). *The Midnight Sky* was Ruhe's first film that employed virtual production design.

How did you work with *The Midnight Sky's* production designer, Jim Bissell? Jim did a lot of research on the latest in space travel, speaking to specialists and scientists at NASA. Out of that came the thought that this spaceship should not be like most other ones we see in movies, where metal hulls get sent into space and look assembled like a rough industrial design. He wanted it to be smarter, more thoughtful, and generally more organic. So, based on these thoughts and research, Jim and his crew created lots of drawings and studies, and built 3D models. George, Jim and I then could "visit" the ship with 3D headsets before anything was built.

How does virtual design help the collaboration between the cinematographer and production designer? It allowed us to see and walk the sets before they existed. We were able to place cameras and test lenses. It was a good way to test colors or see where the light would come from, how it could be in different places or moods. We knew where we wanted to place them before and built them into the sets. And Jim thinks visually with an eye toward lighting – most of which came from his designs – like in the tunnels on the spaceship where the crew floats through rings of light. Sometimes we would change how the rooms were arranged to ensure we had enough space in the real world when we were shooting.

How did you choose what was virtual and what was physical? Based on Jim's experience, we asked, "What parts do Augustine and Iris have immediate contact with, and what do we need for their actions?" Some of the exteriors of Barbeau we shot in the studio, some on location in Iceland. It takes some discipline and imagination when you are on location, and you have to frame for what is not there because the observatory was pure postproduction. While shooting, we added our lights that would be on the building, on stands, to have interaction between the 3D model and the real action. We also used 3D models and a scan of our landscape previously to have an idea of our shots – which lens would show the whole building later, what distance to place a camera crane – which was helpful to know in the rocky landscape.

Was your most complex scene an amalgam of different tools? We used a virtual camera system to previsualize the spacewalk. In the scene, three astronauts are out to repair some damage on an antenna. While they are out there, they get hit by an asteroid shower and get inside when they realize one of them is wounded. It ends in an airlock with a ballet of blood floating in zero gravity. We worked, maybe two months, with a 3D animation of our action by our VFX team. I was using an iPad as a

camera to see the action, frame shots and move around the animated characters. We designed it that way, Stephen [Mirrione] edited it and then we went back and got more shots or changed the animation. When we were done, we would then decide what to shoot practically, which sections of the spaceship would be physically built, and how we would place them. From the movement of our animated characters, the stunt crew could program their wire rig and rehearse only the essential moves with the actors. It was a lot of planning, but it also gave us a lot of freedom on the shoot days. We could focus on the essentials and move fast.

How has virtual production design impacted the way we make movies? I think it takes away the limits and gives you the freedom to tell stories you could not tell before. You can move the camera like never before and take the viewer on a journey. Teamwork and interaction with so many different departments, even long before you start shooting, are key. There are so many parts to what we do, and everything becomes more complex, but ultimately it gives you more freedom. The most exciting thing is to see if what you planned works. Where do you need to adjust? Until you roll camera with your actors, everything is just theory – a well thought-out plan. So it's very exciting to see it all play out. 🎬



Andrew L.

Jones



Andrew L. Jones began as a sculptor on Ron Howard's *How the Grinch Stole Christmas*. He's worked with Robert Zemeckis on *The Polar Express*, Steven Spielberg on *The Adventures of Tintin*, James Cameron on *Avatar*, and more recently, Jon Favreau on his live-action Walt Disney's *The Jungle Book*. Jones' last collaboration with Favreau led to their reunion on Disney+'s *The Mandalorian* [ICG Magazine February/March 2020] alongside the show's fellow production designer Doug Chiang. Jones was honored in 2020 with an Emmy for Outstanding Production Design for his work on Chapter 1 of *The Mandalorian*.

PHOTO BY NICOLA GOODE, SMPSP

How have you designed *The Mandalorian's* sets using virtual production techniques?

The early creative process is fairly typical – in our case, I'm working with Doug Chiang, who is co-production designer as well as the executive creative director in terms of all things *Star Wars* at Lucasfilm. Doug and his team of concept artists have been imagining incredible *Star Wars* environments for years. So with notes or scripts from Jon [Favreau] and Dave [Filoni], they create concepts for each episode and present them to the creative team periodically through prep. Once we have an approved concept, however, it is fed into our Virtual Production pipeline. We have adopted new technology that allows us to create near-photo-real virtual environments and then light, scout and previsualize them long before actually building or shooting them. Our show uses Unreal Engine to create very realistic 3D digital environments. The entire creative team scouts these sets with VR goggles. The DP's are able to create lighting scenarios and set virtual cameras. The set is shared with Previs, which will create shots with the director. The end product of this stage is a CG environment in which we have made as many creative decisions as possible. Then we can confidently send this design off to be built according to how we will eventually shoot it.

The Volume is an exciting new projection process; how does it work? ILM's "Volume" is an immersive filming space that has high-resolution LED panels on the walls and ceiling. We can display our virtual environments on the LED panels. The thing that makes all the difference, however, is that when you take a camera inside the Volume, its position is tracked so that what it sees through the lens is updated to reflect the correct view of the virtual environment from that position. So, unlike a translight, you see parallax in the


virtual environment. Also, the wall contributes lighting and reflections to the physical set and performers within it. The light it contributes varies depending on the type of environment. In some cases, there is no need for movie lights at all. In others, the DP's will add movie lights as on a traditional set.

What factors determine if a particular set is a practical build on stage, a location shoot, created within the LED Volume – or a mash-up of some sort? The Volume has proven to be an incredibly valuable production tool, but we only have one, so we have to choose sets for this process that will give the greatest return. Many factors go into this decision. There are some types of sets that will not be suitable, such as sets that are much smaller than our Volume, sets that have a lot of direct sunlight in the playing area, and environments with a lot of small vegetation, which is hard to render at a high enough frame rate. In other cases, it will be determined by page count. For some sets, we have already created the digital content, so it is very easy and economical to load them back up again – like the use of the Mos Eisley docking bay in multiple episodes and seasons. In all cases, however, we collaborate early and closely with ILM, our VFX partners. Throughout prep, ILM is working with us to narrow-down the choices for the Volume based on the most value to the production.

How does this process help with time and cost savings? It's all a natural evolution of Jon Favreau's filmmaking process over his last few projects. In this case, it is particularly well suited as our lead character is wearing shiny reflective armor. But more than that, the process is the opposite of green screen shooting. We are very front-loaded. VFX is an integral part of preproduction. The process requires that we have our decisions

made well in advance, so for the art department and construction, we can make value decisions very early on. In the best case, we are shooting sets with incredible production value in-camera without having to build massive sets.

Virtual production design is here to stay, but it still has to develop more. What is your wish list from a production designer's point of view? As mentioned above, the intent is to shoot scenes totally in camera. Nonetheless, *Star Wars* being what it is, there are often VFX passes, creatures and vehicles to add, laser blasts to shoot, *et cetera*. The technology is getting more and more sophisticated. ILM keeps developing new tools to improve the workflow and efficacy of the process. My hope is that it continues to broaden the scope of what is possible in camera. We are often surprised by how effective shots are, so I'm sure we are only going to learn more by doing. It has taken considerable nerve by Jon, Disney, Lucasfilm, and ILM to embark on this project. I'm very pleased to see it paying off and hope it continues to evolve.

How do you see traditional/physical production design evolving? Will we see a time where only location work will still be viable and all stage work will be virtual? Stage work and the building of practical sets are not going away – in fact, using a combination of methodologies is perhaps the best use of this technology. Designing virtually is evolving to become yet another tool in our industry's toolbox, allowing filmmakers increased creative freedom to express their vision. But I also think it might lead to new media forms that merge traditional filmmaking with VR, AR, non-linear narrative and even in-person experiences like LBE's [location-based entertainment] and theater. 



Todd

Cherniawsky



PHOTO BY FRANK SCHAEFER

Canadian Todd Cherniawsky studied production design under Robert Boyle (one of Alfred Hitchcock's primary production designers) at AFI. He worked his way up through the art department as set designer, assistant art director, and art director on such films as *Armageddon*, *The Hulk*, *Lemony Snicket*, and *War of the Worlds*. This trajectory put him in an early position to be one of the first adopters of digital tools in the art department, which he implemented on movies like *Alice Through the Looking Glass*, *The BFG*, and *Star Wars VIII: The Last Jedi*. His production design credits include *Splice*, *Ginger Snaps* trilogy, *Star Trek: Discovery*, *Pet Sematary*, *Picard*, and the upcoming feature *Distant*. Currently, Cherniawsky is production-designing *Obi-Wan Kenobi*, the upcoming new *Star Wars* series from Lucasfilm and Disney+.

How has designing virtually impacted your craft? Working with a VAD (Virtual Art Department) parallel to running a traditional art department is what makes the difference. For me, the design process doesn't change. It adapts to the very front-heavy design needs when you use a production methodology like Lucasfilm's StageCraft. The art department needs even more lead time to feed the virtual needs of the design, like scenery and set decoration.

What different virtual tools have you used, and what is coming through the pipeline? Rhino and Maya are the screwdriver and hammer of the toolbox. As you add other tools into the process, such as Unreal Engine, Twinmotion, and Enhance, you're adding a paintbrush, saw and pliers.

How do you work with the DP and chief lighting technician, and what does that provide? Lighting sessions in the virtual world for physical-world scenarios is a sketch or estimate at best. Trying to imitate what real light does in a virtual environment just doesn't work completely. Unreal can come close, as do several other rendering engines. However, lighting sessions with a DP in a virtual world for virtual world content is amazing. What we've been able to do with Unreal and StageCraft, with *Obi-Wan Kenobi* Showrunner Deborah Chow, DP Chung-hoon Chung, and VFX Supervisor Patrick Tubach in virtual lighting sessions for this new series has been amazing. What you see is what you get, allowing all parties to see it in advance and in real-time in the Volume.

What are some of the benefits of virtual design? It can be helpful in understanding big spaces, especially backlot layouts. Using traditional foam-core models is still helpful, and in most situations, still better than virtual scouts. However, when the buildings are large and involve a significant number of set extensions, virtual scouts can be instrumental for all branches of the art department to see the final intent of a set/environment.

How do you decide what is physical and what is virtual? My starting rule is that any

object the cast touches or interacts with is real. The ground and walls within the areas that they move in (the action area) are built. I also aim to build support for action/stunts and any shadow interaction needs, in conjunction with the DP. Then, you negotiate with others – the director, VFX, props, stunts, and the DP – as to where the build line finally goes.

What do you look out for when you have designed virtually and build physically? Making these selections just takes mileage and experience. I approach breaking a set down using the simple idea of foreground, midground and background. The fore and mid are physical; the back is virtual.

LED's have taken over. How have they impacted your set design? On my last three sci-fi or fantasy shows – *Star Trek: Discovery*, *Star Trek: Picard*, *Obi-Wan Kenobi* – built-in LED lighting (daylight/tungsten and 3-color) make up about 75 to 85 percent of the set lighting (built sets). Location work can be equally as high, especially in the sci-fi and fantasy genre, but when you're outside in a desert or forest, traditional set lighting is the way to go. I'm a big fan of the fixtures department and the great men and women of IATSE Local 728 for making my set decorator and myself look good on these shows. [Laughs.]

What are your thoughts about how virtual design, and eventually virtual sets, may change or diminish the physical build – a craft that has been around for 100 years? The fear that virtual production is going to replace traditional production makes me laugh. Even saying that it will diminish how much is built is only applicable to some cases. Every decade, media culture gets fearful of the "next thing." Records scared radio, compact discs scared records, the iPod scared compact discs, and so on. Records, radio, compact discs, and iPods are all just the tools of distribution for the medium of music and voice. Virtual production is equally just another tool and is only going to help us tell stories in new and interesting ways. 🎮

INDEX

COLOR TH

B

BY PAULINE ROGERS

Compact
Cassette



MONO STEREO NOISE FILTER

THEORIES



INDIEGROUND
INTERNATIONAL
RECORDS 2021



ULTRA PRECISION
MECHANISM

EF90



While Dailies Colorist Benny Estrada doesn't work on the set, he is typically the conduit between the cinematographer, DIT and final colorist. He also helps to shape how the cinematographer's vision is represented throughout the editorial process. Estrada, who started in an entry-level position when he joined Company 3, eventually became a DI color assistant, where he learned the fine points of the art and technology involved in color grading images and got to know the likes and dislikes of a great many of the firm's talented clients. In the role of dailies colorist, which he's held since 2009, he has worked on such high-profile features as *Ford v Ferrari*, *Godzilla: King of Monsters*, *Venom*, *Birds of Prey*, *Jurassic World*, *Argo* and many others.

PHOTOS

BY

ELISABETH

CAREN

Benny

Estrada

“THE GOAL IS TO GIVE THE DP PEACE OF MIND THAT THEIR VISION IS REFLECTED IN THE IMAGES WHEN PEOPLE LOOK AT THE DAILIES.”

What makes a successful dailies colorist?

Fortunately, the things I find aesthetically pleasing tend to be what cinematographers and final colorists also find pleasing. Of course, there's a level of trust you develop because cinematographers have a hundred things on their minds. There are many ways for cinematographers to communicate what they want to see in dailies, either directly with me or through their work with a DIT, and I need to understand what they need and apply it to every shot. The goal is to give the DP peace of mind that their vision is reflected in the images when people look at the dailies.

How did you develop these skills? When I started in the vault, I had nothing but a rudimentary knowledge of lenses, film stocks and stops. I learned all of that when I was assisting major final colorists.

What is your working relationship with the DIT? The DIT started out being the key person helping the cinematographer make the transition from film to digital cameras. Today, they are full technicians who help generate LUT's, ensure that people are monitoring what they should be monitoring on set, and ensure everything is properly captured in the correct codec and file format. Sometimes they'll pull reference stills and work with the DP grading them. Some DIT's will


use systems like Livegrade Pro [by Pomfort] in conjunction with the cinematographer to help create a first pass of the look on the fly. It is a great starting point for me to then go in with a fine-toothed comb and make adjustments from my dark, calibrated room.

What is your role in making sure everything matches when projects shoot on different types of cameras, with different sensors and imaging technology? Ideally, a great starting point is to have each camera set up, the exposure set, and the sensors all calibrated together. This is something that a DIT can be instrumental in achieving. Sometimes, when the project is run-and-gun, the DP might simply say, “Make sure every camera matches the hero [camera] as much as possible.”

You work with a color-grading tool set that can make many adjustments to the imagery – curves, windows, keys and selective saturation. How far do you normally take your grading for dailies? My approach is “less is more.” I come from working with film, and I do everything to avoid making something look artificial. Often, the DP will want just basic adjustments. But some cinematographers don't want to wait for final color to see a strong approximation of their vision. The director, editor and others will

live with the dailies for up to a year or more. Since this can introduce some issues down the road, we always make sure that Production is aware of the implications downstream.

What sorts of issues? Some more elaborate corrections won't carry over through a CDL [color decision list], and that could add a bit of a challenge for visual effects to maintain a look to match to in their work. There was a period when studios discouraged the use of secondaries in dailies. Some of those things have been worked out, and now I am often tracking windows or adding other secondaries to get the look the DP wants.

How important is solid communication for you with the final colorist? The more we can all communicate, the better. Sometimes, the DP and final colorist have already built LUT's together that will be part of the color pipeline. Other times, the final colorist hasn't even been chosen yet. My role is to realize the cinematographer's intent with whatever guidance they have provided. In many cases, I will ultimately be guided by looking at how the cinematographer exposed, how they handled color temperatures, where the lighting is coming from in the scene, and, of course, any history I have with that cinematographer. 



Daniel

Hernandez



Daniel Hernandez's path started in television as a camera operator and editor. But somewhere along the line his hobbies meshed into work. First, as an avid free diver and scuba diver, he ended up shooting different underwater projects. Then, flying remote-control helicopters led to remote work with film cameras. Along the way, he met people at the forefront of technology – Glenn Derry, Gary Martinez, Alex Arango, Robby Derry, and Dan Moore. When he was brought onto for *Avatar*, Hernandez worked with 3D, motion capture, virtual cameras, and more – all of which built a foundation that eventually led to his becoming a digital imaging technician.

PHOTO

BY

RICHARD

DUCREE

Has on-set color management changed over the years? It's definitely evolved. The equipment used to be cumbersome, slow to work with, and very limited. On *The Avengers*, I had two TrueLight onset color systems. Each needed its own computer, control surface, and timecode embedder. With the TrueLights, I could create live looks for one camera per system. For any additional cameras, I would create a look with the TrueLights, then send it to additional Blackmagic HDLink LUT boxes.

What is it like today? The equipment is streamlined and much faster, with a broader tool set. My DIT cart consists of one computer to run Livegrade and Multiple BoxIO LUT boxes. There are more tools, but this is the live color part. We can now create CDL's, colored reference stills, colored video files, camera metadata, lens metadata, and more. Some of the data can be captured directly from the camera. We even have the ability to make an adjustment, like re-grading live captured stills after the fact.

Is there a different approach when the project involves VFX? There are some parts that are approached the same for both traditional and VFX shows. The most important is establishing strong communication with the DP, as well as with the studio, Production, Editorial, dailies, and the DI house. This will facilitate a proper workflow. Helping the director of photography to establish formats/aspect ratio and color decisions like LUT's is also important. We will also test cameras, lenses, media, and media download station shot frame and focus leaders, and run full workflow tests.

What's different when it's a VFX movie or a streaming show? My work with Marvel is a

great example. There is a lot more planning and setup with the VFX aspect. Communication with the director of photography starts very early, as most of the time we will test multiple camera systems. Then we work on the format and aspect ratio. At this point, I'll start communication with Marvel's Manager of Image Color and Lab, Michael Maloney. Michael will provide Marvel-approved framing leaders that include hero aspect ratios and any contractual aspect ratios. We determine pixel/millimeter data for full aperture and any included aspect ratios – SDR LUT's, HDR LUT's (in 300, 600, and 1000 nit), and colorspace conversion LUT's. Once cameras, formats, and aspect ratios are determined, I'll create a base camera setting and specification spreadsheet. Michael will send out a set of framing leaders and LUT's for everyone, including DIT, VFX, dailies, and whoever else needs them. For VFX, we'll map any lenses that will be used, do any tests they may need, like frame rate, ISO, flicker, or lighting. During prep, I'll also create camera set-up files and frame lines when additional cameras are added, such as second unit or plate units.

How do you create a seamless pathway when there is a first and second unit? We create camera presets and frame lines to keep all settings the same from unit to unit. This way, they can just load a setup to ensure settings match the main unit. We create CDL's, reference stills for every scene. This will help to match previously shot scenes. Also, we work with Editorial so that they can provide second unit with edited scenes for what's being shot. Whenever possible, we send a live feed or recorded shots from the second unit to the main unit. This helps to get main unit's input.

What's the leading edge of your tech, and why? HDR has become a technology that is used more and more on set. It's definitely not used on all projects, but it can certainly be useful for some, like on streaming shows that will finalize and stream in HDR. It's useful to see at the time of capture what things are going to look like in HDR. For example, if the camera is looking out of a window, in SDR everything will look white and blown-out, but in HDR, you can see more detail and realize you might be seeing something unwanted. Another example is if you are trying to create a sunbeam through a window; it might look good in SDR but not in HDR. Color saturation is another thing that can look different, so HDR monitors can be a useful tool.


Why is having on-set color correction a no-brainer? Because the director of photography can establish a look early on that will travel from set to dailies, editorial, PIX and become a starting point for the DI. It's also an essential tool for lighting. But it goes beyond that. There are lots of ways that we, as DIT's, use it. When we are looking at sensor color drift, lenses, and filters, I use live color to match from camera to camera. And we often use cameras with different color spaces. My current project is an ALEXA show. But we use Red Komodos as crash-cams. The ALEXA color space is Log C wide gamut. RED Komodo's color space is RWG/Log3G10. In this case, I'll use an input color space converting LUT to go from RWG/Log3G10 to Log C. Then I'll use an ALEXA output LUT. Finally, I'll make any CDL color adjustments to match the Komodo to the ALEXAs. Another very important process of on-set color is that you're creating a library of data that can be used for additional photography – CDL's, reference stills, logging LUT's, camera metadata and more. 

PHOTO BY TOBIN
Y E L L A N D

Spencer Shwetz wanted to get into the industry so much he cold-mailed roughly 100 DP's, inviting each of them to lunch. Two came back with a "yes." Lunch with Lawrence Sher, ASC, was illuminating. A few canceled lunches with Jas Shelton led instead to an invite to a test of an old 1970s tube camera that Shelton would use on *The Stanford Prison Experiment*. Shwetz followed Shelton onto the movie, met 1st AC Troy Blischok, Operator Tom Clancey, and Steadicam Operator Dana Morris – a great introduction to Local 600. Today Shwetz is a busy DIT working on *American Crime Story: Impeachment*, with Director of Photography Simon Dennis, BSC.

Spencer Shwetz

How do you work with DP's to transition their vision from on-set to post? I think the Team Deakins podcast said it best when they expressed how essential it is for Editorial to be looking at as close to a final color image as possible throughout the post process. For example, if the DP lights a moody morning scene that accidentally gets translated to two stops over on the way to Editorial, that is what Editorial will become accustomed to for that scene. Even though the grade is wrong and does not fit the timeline of the story, re-grading that scene will be a battle the DP will have to face in the final; and unfortunately, it might not always be one they win. This is why it is so important to translate the DP's vision directly from set to the dailies house and then on to Editorial. Getting the image right from the beginning will save a great deal of time for everyone.

How important is your relationship with the dailies colorist? I never realized the importance of the dailies colorist until working on Ryan Murphy's Netflix show *Ratched*. Julio Giron, the dailies colorist, had a long-time collaboration with Nelson Cragg [ASC]. After the first camera test, we went to MTI Film to

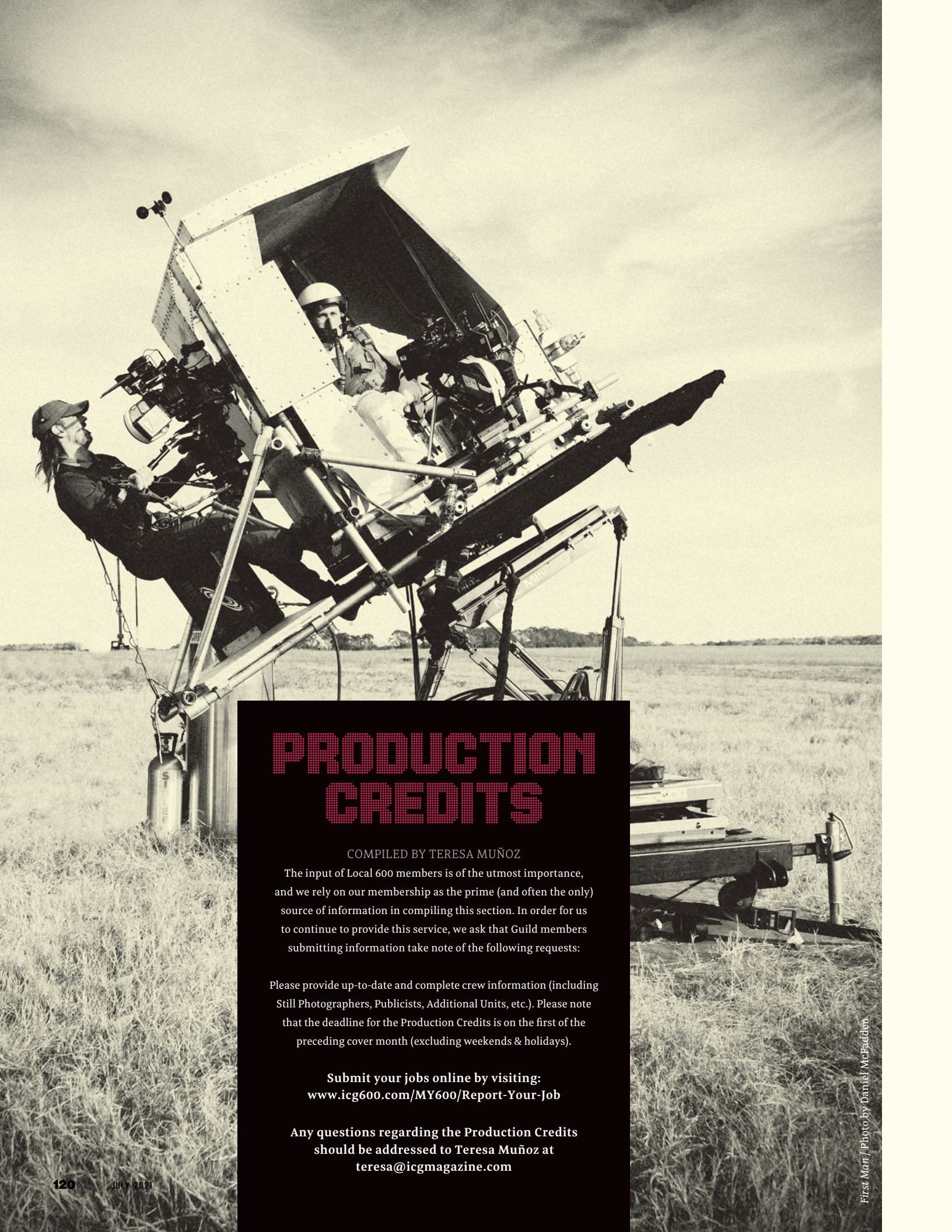
go over the looks we had set up on set. In the past, I've worked with DP's whose dailies colorists were almost expendable. Not here. If ever I had a question or was not feeling comfortable with a scene or grade, I could send Julio a test or give him a call. When Julio moved on to be a final colorist, we began working with Carl Braz. Carl loves filmmaking so much that on multiple occasions, he would wake up early and come to set to sit at the DIT cart. After we would wrap, he would then go to MTI to do the dailies color. I've never seen a passion like Carl's.

On-set color with DP is essential, but other departments are equally important. That's true. Like how other members of the DP's team work – from the key grip and gaffer to the production designer and on-set costumer, they all contribute. Often the DIT is an easier door to the DP because of how busy the DP can be. For example, on *American Crime Story: Impeachment*, Production Designer Jamie Walker McCall and her team will send scout photos that they want to print out for the director boards. From there, I will load them into Pixelmator Photo on iPad and rough-in a grade with Simon [Dennis]. Even

though these are just scout photos from a Sony A7 or iPhone, we have the ability to set the tone of the color grade and share that in a few minutes. Sometimes our gaffer, Jeff Chin, will express that he is nearing the end of his CCT range on his Sputnik DS1 Light. Before the panic period of golden hour, Simon, Jeff, and I can have a conversation in advance about what we want to do to maintain the earlier look and color.

How can a DIT help the postproduction process? Sometimes it's as simple as helping set up their iPad or dialing in a DeckLink card. It is important to remember that no matter how good or prepared you are, there will always be moments when you need help from Postproduction, the postproduction house, and even Editorial. I value the relationship I have with my friends in post, like Melissa Jones at RMTV and Barbara Marshall at MTI. Post can always help when something goes wrong, whether it's a corrupt LUT, CDL's that don't match up, or the wonderful legal/extended world we live in. Having others watch your back and feeling comfortable to reach out in a situation of confusion or error is key to all of our success. 🍷





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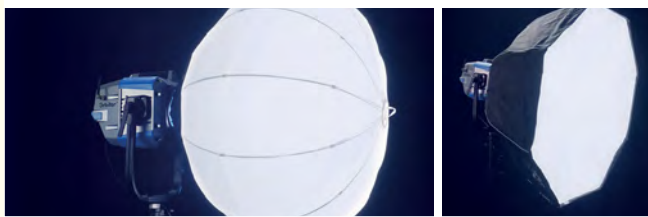
COMPILED BY TERESA MUÑOZ

The input of Local 600 members is of the utmost importance, and we rely on our membership as the prime (and often the only) source of information in compiling this section. In order for us to continue to provide this service, we ask that Guild members submitting information take note of the following requests:

Please provide up-to-date and complete crew information (including Still Photographers, Publicists, Additional Units, etc.). Please note that the deadline for the Production Credits is on the first of the preceding cover month (excluding weekends & holidays).

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THE GOOD NURSE

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 SAM ELLISON - A CAM OP
 REBECCA RAJADNYA - A CAM 1ST
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 JODY LEE LIPES - DP
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Peter Kramer

Working on *Lisey's Story* for Apple TV+ was a great experience, even though I was limited to the pictures I was allowed to take. Working with very talented people like Director of Photography Darius Khondji [ASC, AFC], Camera Operator Jim McConkey [SOC], 1st AC Chris Silano and other amazing crew members made up for it. We were shut down due to COVID-19 with only a month to go and had to come back in the Fall to finish, which was not easy. So, from the PA's up to the top, this team should be extremely proud of what it created.

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