

nightscape

A PUBLICATION OF THE INTERNATIONAL DARK-SKY ASSOCIATION

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The Dark Sky Preserve — 5816 Road 506
(44.91791, -76.93947)
south of Plevna, Ontario.

COME ENJOY AN EXPERIENCE THAT WON'T BE FORGOTTEN!

North Frontenac is lucky to have some of the most southerly exceptional dark skies in Canada. The darkest region in the area, known as the 'Dark Peninsula', encompasses 4 Counties; Frontenac, Lennox-Addington, Hastings and Renfrew. For millions of people in southern Canada and the north-east US, this is the best view of the night sky and the Milky Way that they will most likely experience.

The Dark Sky Preserve is a public space with amenities, including parking, washroom, electrical service and the concrete pad, where anyone can set up their telescope and enjoy the dark skies.



North Frontenac Township
Dark Sky Preserve / Stargazing Pad
5816 Road 506, Plevna Ontario, Canada
"Four Seasons, More Reasons"



From the Executive Director

Dear Members,

The last year was a good year, but 2014 is shaping up to be even better. Thanks to our success with the Florida sea turtle habitat restoration project, we will be able to make real progress on several important projects this year.

First is the Save Our Stars (SOS) outreach program. We will be signing up as many groups as we can for a spring launch. The program is designed to engage the public in night sky outreach events within a short drive of urban areas. Volunteers will briefly talk about light pollution and demonstrate common sense ways that everyone can use to reduce wasted light.

The SOS outreach program utilizes our short film "Losing the Dark" to provide a general overview, followed by hands-on activities such as a "live" light shielding demonstration and night sky brightness monitoring using the *Dark Sky Meter* and *Losing the Night* free smartphone apps. Attendees will then enjoy the rest of the evening stargazing with telescopes provided by SOS volunteers. If you and your astronomy club or community group would like to participate in this exciting new program, please contact SOS Program Manager John Barentine at john@darksky.org. Participating clubs will receive discounted IDA memberships and volunteers will get some great gear.

Speaking of volunteers, do you have time to devote to making the night sky better in your community? We want to energize and strengthen our IDA chapter program and we'd love your help. IDA chapters do important work in their communities and are integral to the success of IDA's mission. Check out our Resources page on the IDA website to find a chapter near you. If no IDA chapter exists in your area, why not start one! Simply fill out an IDA chapter application form. To help support chapter volunteers and dark sky advocates, we will be holding several webinars this year to hear your ideas and provide training in areas such as how to advocate for lighting ordinances and working with public officials. Contact Scott Kardel at wskardel@darksky.org for more information.

Another initiative we are launching this year is the Smart Urban Lighting program. It is designed to help cities make the transition to new lighting technologies without degrading the night sky. While many new fixtures are more energy efficient than older technologies, too often city planners ignore ways to save considerably more energy such as reducing illumination levels, implementing lighting curfews and only lighting areas that need it. We must reach out to every city before they make tragic mistakes that could harm night skies for years to come. (See page 2 to learn more about the SUL initiative.)

The IDA 2013 Annual Report begins on page 22 in this issue of *Nightscape*. It has been an exciting and rewarding year for us. Thank you for being part of it and, as always, we are grateful for your support.

All the best,



Bob Parks, Executive Director

On the Cover

Image of night sky and Orion constellation over Skellig Islands taken from the Kerry International Dark Sky Reserve in Ireland. Image captured by Peter Cox, an award-winning landscape photographer from Dublin, Ireland. To see more of his work, visit www.petercox.ie.



The mission of the International Dark-Sky Association (IDA) is to preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting. IDA was incorporated in 1988 as a tax-exempt 501(c)(3) nonprofit organization. (FIN 74-2493011)

CHAPTERS

Australia, Österreich/Austria, Canada (2), República de Chile/Chile, Česká Republika/Czech Republic, 中国/China(4), India, Éire/Ireland, ישראל/Israel, Ελλάδα/Greece, 香港/Hong Kong, Magyarország/Hungary, Italia/Italy, 日本/Japan, Repubblika ta' Malta/Malta, Slovenija/Slovenia, Schweiz/Switzerland, Sverige/Sweden, United States (36)

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PHOTO CREDIT: BOB PARKS

The IDA Smart Urban Lighting Initiative

by Bob Parks

The International Dark-Sky Association Smart Urban Lighting (SUL) initiative is being designed to help cities and communities install outdoor lighting that maximizes energy efficiency by reducing waste from over lighting, unwarranted lighting, uplight, glare and light trespass.

The IDA will be developing the program in consultation with lighting manufacturers, engineers and designers, vision scientists and public safety professionals to ensure that its recommendations will result in improved visibility and safety while meeting ambitious conservation goals.

In the rush to embrace new solid state lighting (SSL) technology many cities have found it difficult to find comprehensive information regarding the best choices to achieve optimum results from outdoor lighting modernization plans. Lighting manufacturers and sales professionals cannot be expected to provide extensive consulting in this critical transition, as many of the most important elements may not be in their inventory. This program seeks to incorporate the best technologies and products and provide new designs that maximize the energy efficiency by minimizing waste.

The principles of the SUL initiative are simple: light only what is needed,

The principles of the SUL initiative are simple: light only what is needed, when needed, and only at illumination levels necessary to get the job done.

only when needed, and only at the illumination levels necessary to get the job done. While these principles are simple, they are often overlooked in urban lighting design. The result has been escalating energy costs, increased CO₂ emissions, and light pollution. The primary reasons behind this trend are a genuine concern for public safety and lighting standards that have not kept pace with technological progress and vision science research. LED (light emitting diode) lighting is a new technology offering options not available

with older high intensity discharge technology. Trying to use this new technology with old design practices will result in missed opportunities to save at least twice the energy possible from just the efficiency improvement between the two lighting technologies.

Based on new research from Nancy Clanton and Associates and the Virginia Tech Transportation Institute, a new understanding of visibility has emerged. (See page 4 to learn more about their research.) This research demonstrates the need to clearly focus on visual contrast when developing lighting standards. Unfortunately, most current lighting standards tend to focus only on illumination levels and uniformity with little concern for their effect on visibility. We believe the results of this new research show that the future of lighting standards must be based on contrast: both luminance and color. This new metric for visibility will allow for dramatically reduced light levels using broad spectra light sources like SSL.

At the same time, the SUL initiative stresses quality lighting design that eliminates glare and light trespass. Designs that don't address these basic concepts impair visibility on a physiological level. In creating new urban lighting designs, the principles

of vision science must be incorporated. Understanding concepts like photopic, mesopic and scotopic vision and visual adaptation are essential to design for maximum efficiency, safety and visual comfort. Lighting designs that ignore these principles in an effort to meet antiquated standards based only on illumination levels and uniformity, result in compromised visibility, efficiency and safety.

The lighting design concepts of the SUL program encourage the use of the right amount of illumination for the task and the reduction of illumination levels when vehicle and pedestrian density decreases. The use of adaptive controls that adjust lighting levels over time are essential to meeting the goals of the SUL program. Many cities are reticent to dim lighting to meet changing conditions and instead maintain excessive illumination levels in a misguided effort to ensure “safety.” Real safety, including reduction of crime and accidents, is not enhanced by over lighting. While there is a general consensus that the “feeling of safety” may increase when lighting levels increase, statistical evidence indicating that safety actually increases does not exist. In fact, some studies show a correlation between increased lighting levels and an increase in crime.

The SUL new lighting designs use recommendations from the Illuminating Engineering Society (IES) that now recognize the significant role automobile headlights play in illuminating the nighttime environment. Based on soon to be released IES guidelines, the SUL recommends no street lighting on roads that have speed limits of 35 per hour or less. To augment

this reduction, the SUL instead recommends the use of low-level, pedestrian-friendly sidewalk and path lighting. This can be enhanced by the use of high reflective coatings on concrete sidewalks to provide additional vertical illumination for facial recognition. Bollards and fixtures on short poles move the source of illumination closer to the intended surfaces allowing dramatic reductions in energy. As with all SUL lighting, this pedestrian lighting should use adaptive controls to maximize energy reduction.

The color of lighting has received new attention as LED technology has arrived on the scene. The color of light is often considered just an aesthetic issue, but color can have profound impacts on both visibility and ecology. White LED technology initially had very high blue-rich content due to the nature of its design. As the technology has matured, the ability to shift energy into the longer wavelength portion of the visible spectrum has improved. With this shift, the efficacy of “warmer” color temperature options has also increased. Other improvements in technology allow us to dynamically “tune” the spectrum of the fixture to minimize its impact on the environment, including human health. While consumers appear to prefer “white” light over high and low pressure sodium light sources, evidence suggests that consumers dislike blue-rich white light, as well.

While consumer preference is one factor in the choice of the color of lighting, the general public is often unaware of the environmental and human health impact of artificial light at night (ALAN). ALAN already has a negative

impact on the nocturnal environment, but blue-rich white light will significantly increase circadian disruption.

Circadian disruption occurs when ALAN disturbs the regular rhythm of day and night. All species have evolved under a cycle of roughly 12 hours of day and 12 hours of night. When this is disrupted, the negative impacts on a wide range of activities and biological functions can be devastating. While humans may be better able to control their nocturnal environment, most species cannot. For this reason outdoor lighting must be installed to minimize its impact on the environment.

Good ecologically responsible outdoor lighting will employ color temperatures that are as warm as feasible while also eliminating glare and light trespass. Fortunately, LED technology is capable of providing all of these requirements efficiently.

A reasonable balance between maximum energy efficiency and adverse ecological impact must be maintained. Being “green” is not just a question of energy savings. New ecologically responsible developments in LED include amber LED and filtered LED that remove blue light by eliminating wavelengths below 500 nanometers. These technologies, along with the use of fully shielded low pressure sodium, can be used in and around ecologically sensitive areas, optical astronomy facilities and for communities with a high degree of awareness and concern for the environment.

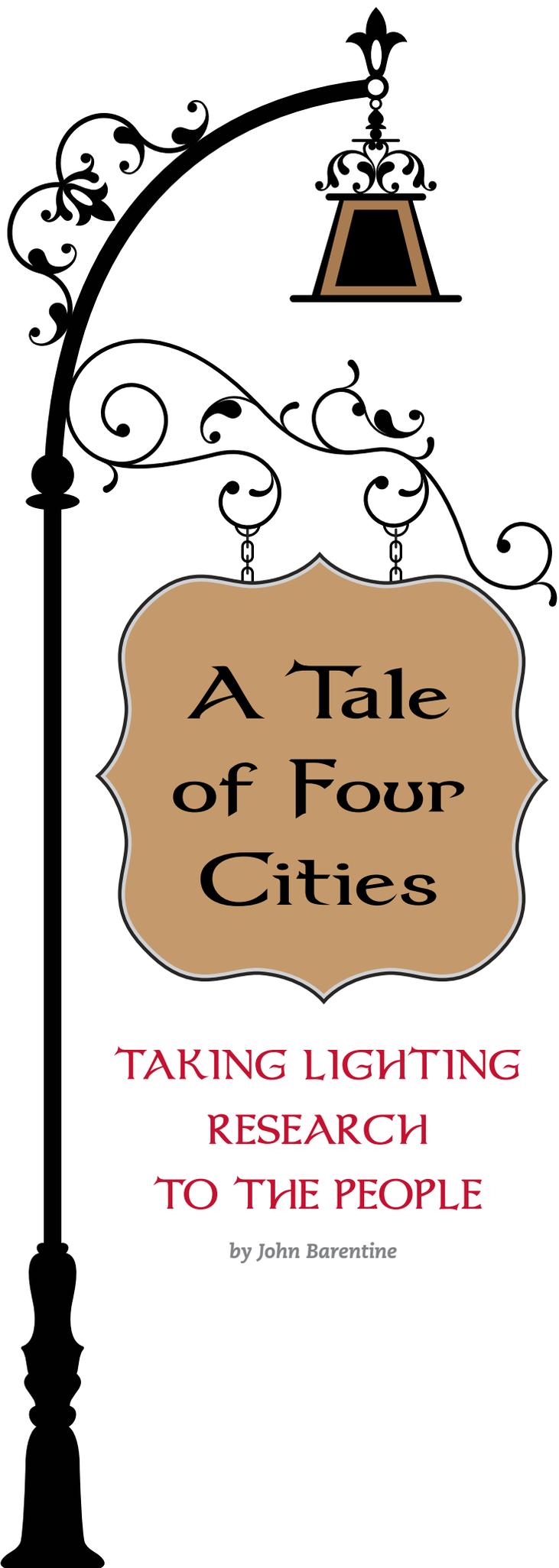
IDA will be in Las Vegas to promote the Smart Urban Lighting initiative at LightFair International on June 3-5. Executive Director Bob Parks will also be speaking at the conference on the topic.

A bird's eye view of light pollution in Chicago. PHOTO CREDIT: JIM RICHARDSON



An example of good pathway lighting on the campus of George Mason University in Fairfax, Virginia. PHOTO CREDIT: BOB PARKS





TAKING LIGHTING RESEARCH TO THE PEOPLE

by John Barentine

At the 2013 IDA Annual General Meeting, Nancy Clanton presented research results of a multi-year effort to determine public perceptions of street lighting under various conditions while also measuring the visibility of objects. Nancy is a professional engineer and president of Clanton and Associates, a lighting design firm in Boulder, Colorado, and a co-investigator with Virginia Tech Transportation Institute. The individual studies were funded by Northwest Energy Efficiency Alliance, City of Anchorage, City of San Jose and San Diego Gas and Electric. Her AGM talk, titled “A Tale Of Four Cities,” contained, as Nancy put it, “five years of research in 15 minutes.”

The researchers set out to address a number of research questions related to the ways we light our roads and streets. The factors thought to influence visibility of objects like pedestrians include the color, intensity, and distribution of light, as well as the condition of the pavement (wet versus dry). Rather than gauging opinions of lighting industry professionals, the researchers sought out “real people” in each community and attempted to control for demographics by including participants of both genders and a wide range of ages. Participants were recruited in part through social media and in Seattle, offered nominal compensation for their time in the form of gift cards.

Nancy and her co-investigators devised a two-part system to collect both subjective and objective data on the effects of various types of lighting on the comfort and safety of pedestrians and drivers. In each location, temporary lighting was installed along short lengths of city streets including a variety of lamp types and illumination levels. Participants were first led on foot through the specially-lighted areas and asked to respond to survey questions about whether they felt the lighting was comfortable and safe. Next, they were individually driven at 35 miles per hour down the same streets and asked to spot a series of randomly positioned, colored “visibility targets” in and near the roadway. When a participant saw a target, he or she pushed a button that triggered equipment mounted on the vehicle measuring the distance to the target, color characteristics of the scene, luminance and illuminance. Nancy said the measurement process resulted in the collection of “thousands of pieces of data.”

The team observed a combination of geography and psychology at work in Anchorage, Alaska, a city that sees extended periods of both darkness and daylight throughout the year. At 400 Watts (W) per high-pressure sodium (HPS) luminaire, lighting levels in Anchorage are roughly three times higher than most cities in the lower 48 states. In addition to HPS, a variety of light-emitting diode (LED) fixtures were tested; researchers found that even when they dropped the lighting level in Anchorage to a mere nine percent of the standard 400 W HPS fixture, the detection dis-



Nancy and her co-investigators devised a two-part system to collect both subjective and objective data on the effects of various types of lighting on the comfort and safety of pedestrians and drivers.



Survey participants evaluate lighting in San Diego. PHOTO CREDIT: SCOTT KARDEL

tance of the visibility targets only dropped by about 30 percent. From this result, they concluded that the Anchorage standard results in overlighting of city streets.

In San Diego, where 250 W HPS is the street lighting standard, visibility under the various lamp types was tested at 100 and 50 percent of the corresponding lighting level. The team again found that decreasing light levels by a certain, fixed percentage did not result in a proportional decrease in the object detection distance. Of the lamps tested, Nancy said, 250 W HPS was “the biggest loser when it comes to detection distance, compared to the other sources.”

The color of lighting was examined when the survey made its next stop in San Jose, Calif. In addition to the standard HPS (2100 Kelvin, or K) and low-pressure sodium (1700 K) color temperatures, three color temperatures of LED (3500, 4100, and 5000 K) were also represented in trials. The bluer LEDs (4000 K and 5000 K) yielded the same or larger

A vehicle specially outfitted by VTTI to take measurements of visibility in the road survey. PHOTO CREDIT: SCOTT KARDEL



detection distance for visibility targets compared to either type of sodium lamp at a considerably lower energy cost. This shows that the color of street lighting is as important as the intensity of light it produces. “Lighting level,” Nancy found, “doesn’t necessarily mean better detection.”

The most thorough study of the project was conducted in Seattle in the spring of 2012, paring down the variables even further. In previous cities, they used fixtures from different manufacturers. For example, the glare from one fixture to the next differed. In Seattle, they sole-sourced the fixtures used and looked at three, different relative lighting levels (100, 50, and 25 percent) among the same three LED color temperatures used in San Jose. This approach, as Nancy put it, asked, “Where are we going to hit the cliff of the ‘visibility plateau’?” They hypothesized that the detection distance for visibility targets would plummet at the lowest lighting levels. In addition, the researchers intended to test both wet and dry pavement conditions; despite Seattle’s notoriously rainy climate, no rain fell during their survey period. As a result, the City of Seattle used tanker trucks to spray the streets with water to simulate wet road conditions.

The 332 participants were divided into a total of six groups, one at each combination of LED lighting level and wet/dry pavement condition. In the subjective survey, Nancy and her collaborators found no statistically significant difference in responses regarding the participants’ feelings as to whether they found the lighting level “comfortable,” regardless of wet/dry conditions. The results surprised the team. “The whole idea that the public won’t want you to dim the lights?” Nancy asked the AGM audience. “They don’t even know you’ve done it!” That survey subjects felt equally comfortable in low and high levels of light was attributed to the logarithmic, rather than linear, response of the human eye to light. There was also no significant difference in each case when subjects were asked if they found the light levels to be “safe” at certain combinations of intensity and pavement condition. Participants reported feeling *safer* at lower levels of light.

CONTINUES ON PAGE 6

A Tale of Four Cities

CONTINUED FROM PAGE 5

Opinions about lighting color had a surprising geographic dependence. While participants in San Diego and San Jose preferred the 3500 K LED fixtures for comfort and safety, Seattleites preferred the slightly bluer light of 4100 K LEDs. Furthermore, subjects in Seattle showed a distinct preference for color based on gender: women liked warmer colors while men favored cooler temperatures. Nancy speculated that because it is thought that the X chromosome encodes some of the biological machinery of color vision, men are not as sensitive to color as women. It remains unclear, however, why the gender difference was noted with statistical significance only in Seattle.

The team found that because many street lighting designs don't take sidewalks fully into account, streetlights deliver inadequate amounts of light for pedestrians when the fixtures are set to emit less light. They key is backlight, a term characterizing how much light a particular luminaire emits in the backward direction. Dark-sky friendly fixture design often reduces backlight on which pedestrians rely. "If your street light is not designed to light the sidewalk, we've got a problem here," Nancy said. "Maybe we should design street lighting to light the sidewalks differently than the streets."

The driving tests in Seattle were the piece de résistance of Nancy's AGM talk. They considered all lighting levels and colors, and pavement conditions, finding that standard 250 W HPS fixtures gave the worst results in terms of object detection distance. 4100 K LED fixtures improved detection distance 100 percent over standard HPS, regardless of whether the pavement was wet or dry. The uniformity of lighting didn't help, suggesting that street light poles may be spaced too closely together in most urban settings.

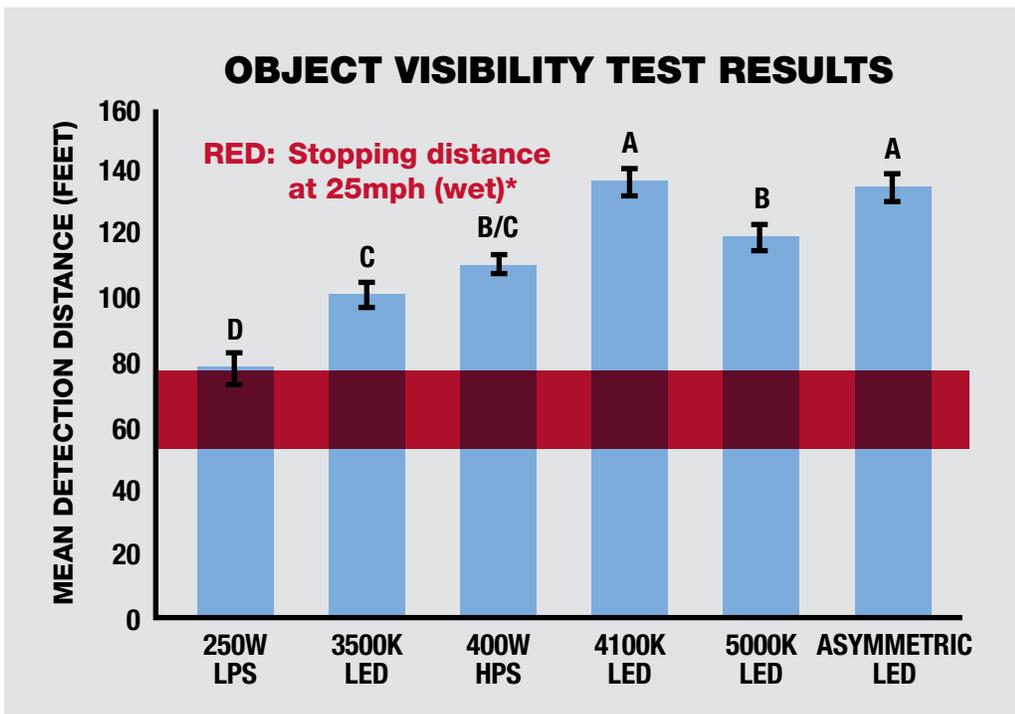
Nancy summarized the key results of the overall study and made suggestions for what lighting standards should

be consider in the future. Visibility is clearly linked to contrast, she said, not the absolute lighting level. Adaptive strategies like dimming lighting do not appear to change the contrast of objects, and a higher degree of lighting uniformity appears to decrease visibility. Color also matters. In Seattle, 4100 K LED lamps were tops in visibility, providing the best color contrast for a variety of objects. Nancy suggested that standards organizations should reorient their recommendations toward contrast-based criteria instead of relying solely on lighting levels. Also, policymakers would do well to consider lighting curfews, or other adaptive lighting controls, given the study results.

Perhaps we need to thoroughly re-think how we light our streets. "Maybe it's something in the curbing that shoots light across the roads," Nancy said. "Maybe it's OLEDs [Organic LEDs], maybe it's striping, maybe it's something activated. What if our cell phones could activate lighting as we walk down the street?" LED technology offers the ability to tune the color of lighting to the need at hand; for example, street lights could give off more blue light during rush hour and switch to longer wavelength light at night.

Technology offers lighting designers more choices than ever in the amount and color of light, as well as where that light can be placed on our streets. The research that Nancy and her collaborators have undertaken adds information designers can use to make outdoor lighting more ecologically sensitive and dark-sky friendly while enhancing our safety and security in public places at night.

Nancy E. Clanton is founder and president of Clanton & Associates, a lighting design firm specializing in sustainable design. Her presentation, "A Tale of Four Cities: Taking Lighting Research to the People," is available at: <http://bit.ly/1iu5fny>.



Results from object visibility tests in Seattle under all conditions. The blue bars represent the distance at which subjects saw the visibility targets according to lamp type and color. The horizontal red bar shows the range of distances required to bring a vehicle to a full stop from 25 MPH on wet pavement conditions.

A New Year's Resolution

Let's commit to stopping the spread of light pollution,
the single greatest threat to our enjoyment of the night sky.

by J. Kelly Beatty

For 25 years the International Dark-Sky Association has been fighting light pollution, the single greatest threat to our enjoyment of the night sky. Isn't it time that amateur astronomers worldwide gave their full support to the IDA?

Many of us remember a time when the night sky was dark pretty much everywhere. I was particularly lucky, coming of age in a rural California town above which the stars shone like diamonds on black velvet. I could just walk outside on a summer's night and – *wham!* – the Milky Way practically assaulted my eyes.

These days I'm on the other side of the country, but I can still see some of the Milky Way from my suburban home on a good night. I count myself among the fortunate in that respect. But the situation isn't perfect. Over time the light pollution from Boston and from the ugly commercial sprawl of nearby Nashua, New Hampshire, have nibbled away at my stars.

I'll bet you've experienced the same loss, if not worse. Most of you can't see the Milky Way from your backyard anymore. You probably don't spend as much time looking for meteors because skyglow washes out all the faint ones. In fact, you probably don't observe much now at all because the night sky just doesn't beckon the way it used to.

It doesn't have to be this way, y'know.

In the late 1990s I began covering meetings of the International Dark-Sky Association for *Sky & Telescope*. The IDA got its start 25 years ago when David Crawford (a professional astronomer) and Tim Hunter (an amateur) joined forces in the astronomical mecca of Tucson, Arizona. The region was growing rapidly, and rampant outdoor lighting was threatening to compromise the pristine skies over neighboring Kitt Peak National Observatory.

Crawford and Hunter succeeded – today Tucson has tougher outdoor-lighting



standards than any big city in the country, and Kitt Peak's night sky is still dark.

Meanwhile, the IDA's influence has grown steadily. Two years ago it created an award-winning video, *Losing the Dark*, that's been translated into 12 languages and downloaded for use by more than 800 planetariums worldwide. IDA's professional staff has competed for, won, and executed a turtle-habitat restoration project for the State of Florida. And lighting manufacturers are lining up to get an IDA Fixture Seal of Approval on their hardware.

Just last month, the fight against light pollution was featured in *Men's Journal* (1 million readers) and on *CBS This Morning* (3 million viewers).

All of this warms my heart. It means "light pollution" is something that most everyday people have heard about and many care about. It means that the subject has caught on with lighting professionals, environmentalists, human-health specialists, and urban planners. It means that there's hope, a chance, that over time the spread

of light pollution will not only be slowed but even reversed.

Here's the problem, though: The IDA isn't getting enough support from the very individuals who stand to gain the most from its success: amateur and professional astronomers. Statistically, only about one of every 100 backyard stargazers is an IDA member. How sad.

Sure, most of you will nod knowingly, even sympathetically, whenever the subject of light pollution is brought up. That's a start, but how about showing some real support for the cause? You can join the IDA for a modest \$35 per year. That's probably comparable to what you pay to belong to your local astronomy club. For the cost of a single high-end eyepiece, you could remain an IDA member for 10 years.

So what have I done about light pollution, you might ask in reply? A decade ago, when I stepped away from working on *Sky & Telescope* to become editor of its sibling publication, *Night Sky*, I made the decision to get seriously involved in the light-pollution fight. I taught myself the technicalities of illumination. I threw myself into creating outdoor-lighting ordinances at the local and state level. I got elected to the IDA's Board of Directors and, today, serve as its vice president. And I talk about our vanishing night sky to whomever will listen.

Those who frequent this website know that we *Sky & Telescope* editors don't get on a soapbox very often. But this is one of those times. If just one in 10 of you were to join the IDA, its membership would double. So please do join or make a donation. It's a modest resolution to make for the coming year – and one that'll be easy to keep.

J. Kelly Beatty serves as vice president of the IDA board of directors. This article first appeared on the *Sky & Telescope* news blog on January 3, 2014, <http://tinyurl.com/l2jxzm>.

New Partnership with Celestron to Help Save Night Skies

IDA is excited to announce a new partnership with Celestron, one of the world's leading telescope designers and manufacturers. In celebration of the upcoming television series *Cosmos: A Spacetime Odyssey*, airing on FOX and National Geographic Channel, Celestron is introducing the COSMOS™ 60AZ Telescope and partnering with IDA to help save endangered starry skies for generations to come.

In support of IDA's mission, Celestron is donating a portion of the COSMOS 60AZ Telescope proceeds to IDA. To help grow IDA's membership and spread awareness about light pollution, every COSMOS 60AZ Telescope also includes a free one-year IDA membership.

Celestron's partnership with IDA affirms its commitment to helping everyone experience the wonders of the cosmos. In the 34 years since the first *Cosmos* television series debuted, light pollution has increased to levels that deprive eight out of ten children

in the United States and two-thirds of the world population the experience of viewing the Milky Way. Celestron and IDA want to change that.

"Celestron has long been a supporter of IDA and the great work it does towards curbing light pollution," commented Dave Anderson, CEO of Celestron. "Providing IDA with a portion of the proceeds from one of our quality telescopes to assist with its efforts to preserve dark skies is the least we can do. We are proud to be an official corporate sponsor of IDA."

Cosmos: A Spacetime Odyssey, set to premiere Sunday, March 9 (9:00-10:00 p.m. ET/PT) on FOX and Monday, March 10 (10:00-11:00 p.m. ET/PT) on National Geographic Channel, continues the adventure of Carl Sagan's Emmy® Award-winning series *Cosmos: A Personal Voyage*.

The COSMOS 60AZ Telescope will be available March 2014 at select retailers.

Learn more about the COSMOS 60AZ Telescope and other COSMOS products at Celestron.com/cosmos.

In the 34 years since the first Cosmos television series debuted, light pollution has increased to levels that deprive eight out of ten children in the United States and two-thirds of the world population the experience of viewing the Milky Way. Celestron and IDA want to change that.

C O S M O S

A SPACETIME ODYSSEY

by CELESTRON



A proud sponsor of
International Dark-Sky Association.



Experience COSMOS™: A SPACETIME ODYSSEY this spring on FOX and the National Geographic Channel, a thrilling 13-part adventure across the universe, picking up where Carl Sagan's iconic series left off. Then, explore the universe with the COSMOS 60AZ Telescope by Celestron. When you purchase this special edition 60 mm refractor, you're also helping future generations of amateur astronomers. A portion of the proceeds from every sale benefits the International Dark-Sky Association (IDA), a nonprofit committed to minimizing light pollution and preserving the beauty of the night sky. You even get a complimentary one-year membership in IDA!

FOX

NATIONAL
GEOGRAPHIC
CHANNEL

IDA Welcomes Four New International Dark Sky Places

IDA welcomed two new United Kingdom International Dark Sky Places (IDSP) into the program in December 2013, bringing the total in that country to six. Recent designations also include the first IDSPs ever named in France and Ireland, significantly increasing the reach of the program in Europe and protecting nearly 2,100 square miles (5,400 km²) of territory with good outdoor lighting policy and public outreach.

Northumberland International Dark Sky Park

The U.K.'s newest Gold-tier International Dark Sky Park is actually two parks in one: Northumberland National Park and adjacent forestry plantation Kielder Water & Forest Park encompass nearly 580 square miles (1,500 km²) of public lands in northern England. Together, they are the first IDA Dark Sky Park consisting of two independent units. Once at the frontier of Roman Britain where Hadrian's Wall repelled Pictish invaders, Northumberland International Dark Sky Park now serves as a bulwark against the incursion of harmful light pollution into one of the darkest locations in England.

The dark night sky attracts an increasing number of visitors to the region. Kielder Observatory, the UK's largest and most active public observatory, widely promotes local astronomy events and activities. "Dark skies and astronomy have become a passion in the area," according to Heidi Mottram, Chair of the Kielder Water and Forest Park Development Trust and Chief Executive of Northumbrian Water.

As both parks began to vie independently for IDA recognition, it quickly became evident that two heads were better than one. "It made perfect sense to work together to protect one of our greatest assets and make it available to more people," Mottram said.



Stargazing at Cawfields, Northumberland National Park. PHOTO CREDIT: VISITNORTHUMBERLAND.COM

Park officials hope that protecting dark skies through the promotion of responsible outdoor lighting will increase the allure of Northumberland as a tourism destination. "Becoming a Dark Sky Park will reinforce the status of Northumberland as an unspoiled destination offering a true sense of tranquility and wildness – a tonic in this day and age," said Tony Gates, Chief Executive of Northumberland National Park.

Coll International Dark Sky Community

Not to be outdone by the success in Northumberland, the Isle of Coll in the Inner Hebrides islands of Scotland received IDA recognition as an International Dark Sky Community. Located six miles (10 km) west of coastal Argyll, Coll's sparse population and geographic isolation yield some of the darkest night skies in Scotland. It is

also a quiet haven for wildlife. Coll attracts dozens of bird species according to the Royal Society for the Protection of Birds, which owns an extensive reserve at the west end of the island and hosts one of Coll's recognized night sky viewing sites on its land. Nature tourism helps draw thousands of visitors to the island each year.

The island adopted a quality outdoor lighting management plan to ensure Coll remains dark for many future generations of residents and visitors. "Achieving dark skies status will be great for the island in many ways," explained Julie Oliphant, hotelier at the Coll Hotel. "Not only will it ensure that any future development on the island is done in a way that protects Coll's natural and unspoiled beauty, but it will also help promote winter tourism."

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New IDSP

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Pic du Midi International Dark Sky Reserve

Also in December 2013, IDA announced the first Dark Sky Reserve in continental Europe. Pic du Midi International Dark Sky Reserve (Silver tier) takes in 1,202 square miles (3,112 km²) of public and private lands in the heart of the Pyrénées Mountains of southern France, making it one of the largest reserves in the world. It includes both the Pyrénées-Mont Perdu UNESCO World Heritage Site and Pyrénées National Park.

The reserve features the famous Pic du Midi Observatory as its centerpiece. When the observatory was threatened with extinction due to budget cuts, observatory supporters secured its renaissance through a “beautiful alliance between science and tourism,” according to Daniel Soucaze des Soucaze, executive director of Pic du Midi. He said the IDA designation represents an “important milestone” in the history of the observatory, and believes the recognition coupled with the dedicated support of local communities greatly enhances the observatory’s long-term prospects.

Starting with the goal of protecting the observatory from the danger of steadily increasing light pollution, organizers at the University of Pau and Pays de l’Adour developed good relations with cities and towns throughout the region in the past four years. Their hard work produced impressive results. A total of 251 communities adopted a comprehensive outdoor lighting management plan that included retrofits and replacements of existing light fixtures, and the use of new lighting technologies. By 2013, early results showed the lighting



The official announcement of the Kerry IDSR took place on January 27, 2014, at a public event in Cahersiveen, Ireland. Christopher Kyba (second from the right) of the IDA board of directors presented the award to community representatives.

plan could effectively reduce light pollution in the region by 85 percent and energy usage by 38 percent, all while maintaining safe lighting levels for residents and visitors.

Officials at Pic du Midi have even grander aspirations for preserving dark skies in the Pyrénées. In coming years, they plan to work with their counterparts across the international border to expand the protected territory into Spain, making for the first IDA Dark Sky Reserve spanning two nations.

Kerry International Dark Sky Reserve

The first IDSP recognized in the Republic of Ireland was announced in January 2014. Kerry International Dark Sky Reserve includes 270 square miles (700 km²) of lands on the Iveragh Peninsula in County Kerry, about 215 miles (350 km) southwest of the capital, Dublin. It is the first Reserve located in the northern hemisphere to achieve Gold-tier status.

The IDA designation is the result of a sustained, three-year campaign by

the Kerry Dark Sky Group. Organization members dedicated countless hours educating local citizens, civic organizations and municipalities on the importance of dark-sky protection. Their efforts resulted in several towns and villages in County Kerry enacting laws requiring responsible outdoor lighting practices to mitigate light pollution. As an example, the Kerry County Council has committed to replace all public street lighting in the area with efficient, dark-sky-friendly light fixtures this year.

It is hoped that drawing attention to the dark night skies over Kerry will benefit both conservation efforts as well as the local tourism industry. The new outdoor lighting regulations help preserve the natural habitats of various plant and animal species that help define the region’s distinctive character visitors have long enjoyed.

The Dark Sky Group hopes their accomplishment will inspire the rest of Ireland to “go dark.” “The granting of this award will provide new opportunities to enjoy and experience the beauty of southwest Kerry’s night sky,” said Julie Ormonde, Chair of the Kerry Dark Sky Group and Project Manager of the new Reserve. “It will encourage other areas in Kerry, and in Ireland as a whole, to take positive action to protect their own dark-sky areas.”

Officials at Pic du Midi ... plan to work with their counterparts ... to expand the protected territory into Spain, making for the first IDA Dark Sky Reserve spanning two nations.

IDSPlaces Program What's New and On the Horizon

by John Barentine

From time to time, *Nightscape* readers find information in these pages about one of IDA's flagship programs. They may also notice it mentioned on social media or read about it in international news stories. How much do you know about the IDA International Dark Sky Places (IDSP) Program? As the new program manager, I would like to take this opportunity to introduce myself, share some recent highlights and offer a vision for its future.

A native Arizonan, I come to IDA from the "dark side" – astronomy. In the last year of my doctoral studies, I began exploring the intersection of science and public policy, and worked with officials of the City of Austin, Texas, on a strategy to deal with Austin's growing light pollution problem. When the Dark Sky Places Manager position opened at IDA, I was excited about how well it matched my professional interests. I'm happy to now spend my days advocating for a cause in which I believe deeply.

Last year was one of the biggest in the history of the IDSP Program, which made its first designation 13 years ago. In 2013, we designated six new IDSPs:

- Death Valley International Dark Sky Park, California (February)
- Brecon Beacons International Dark Sky Reserve, Wales (February)
- Chaco Culture National Historical Park, New Mexico (August)
- Isle of Coll International Dark Sky Community, Scotland (December)
- Northumberland International Dark Sky Park, England (December)
- Pic du Midi International Dark Sky Reserve, France (December)

Collectively, the dedicated efforts of people at these locations brought 4.9 million acres (about 7,700 square miles, or 20,000 km²) of new territory in three countries under the stewardship of good lighting practices and policy. We expect to name even more new IDSPs in 2014.

I have recently received updates from several current IDSPs through annual reports submitted to IDA. I'm eager to share with you some of the great things they are doing.

Homer Glen, Illinois, an International Dark Sky Community

A Chicago suburb of approximately 25,000 residents, the Village of Homer Glen, Ill., has devoted much time and attention to ensuring new building developments are constructed in compliance with its Outdoor Lighting Ordinance from planning to execution. It has also made considerable progress in an ongoing five-year effort to replace its entire inventory street lighting with full-cutoff, 70W high-pressure

sodium fixtures. Their outreach efforts also have been hugely successful. The Village and neighboring Homer Township have offered free stargazing events since 2008 and over 1,800 people to date have attended from across the Chicago area. The 2013 events attracted the highest attendance ever with approximately 200 people in July and 350 in October. Activities in Homer Glen have drawn the attention of elected officials including Illinois Governor Pat Quinn, who designated August 10, 2013, as an International Starry Night and August 11-17, 2013, as Starlight Week in the Village.

NamibRand, an International Dark Sky Reserve

NamibRand in southwest Africa added two properties in 2012, bringing the total amount of protected territory to nearly 500,000 acres (200,000 ha). NamibRand staff conducted a survey of lighting on the newly acquired properties to ensure all fixtures meet IDA guidelines, and in 2013 extended

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A time-lapse photograph at the NamibRand Nature Reserve of the orbiting International Space Station. The Large Magellanic Cloud shines brightly at the left. PHOTO CREDIT: GEORGE TUCKER



IDSP on the Horizon

CONTINUED FROM PAGE 11

the survey to the entire Reserve. Lights from neighboring resorts now pose the most significant threat to their exceptionally dark night skies. In the past year, reserve staff made a series of nighttime “scouting trips” to assess the impact of their outdoor lighting. According to NamibRand CEO Nils Odendaal, staff will use the surveys to reach out to the resorts in the coming year to “educate them about effects of light pollution on our dark skies, and the benefits that could be derived from adjusting their external light fixtures in order to minimize light pollution.”

Galloway Forest Park, an International Dark Sky Reserve

Galloway Forest Park recently completed refurbishment of two visitor centers and construction of a new £3.3 million visitor center, all of which feature dark-sky-friendly exterior lighting. Regular stargazing programs typically draw about 40 people per event, with tourists coming from as far as France. Keith Muir, Head of Tourism, Recreation & Communications with the Galloway Forest District, has given over 130 night-sky-themed talks at the park since November 2009. The park also attracts artists with dark-sky-themed installations including the Rosnes Benches and Quatinus projects.

The staff now looks to extend dark-sky conservation beyond the borders of the park. They are working with the Scottish national government and local authorities in three regions adjoining the park to further protect night skies through coordinated planning – the first such instance of national-level involvement ever in the U.K. They hope to have a new regional strategic plan in place by the end of 2014. The U.K. Road Safety Marking Association has approached the park about a two-year project to demonstrate that good and correctly applied road markings can negate the need for costly and intrusive streetlights altogether.



Night sky at Owachomo Bridge at Natural Bridges National Monument in Utah.
PHOTO CREDIT: JACOB W. FRANK, COURTESY OF THE NATIONAL PARK SERVICE

The efforts in the Galloway area are not only preserving dark skies, according to Muir, but also *expanding* their reach. As a result of changes made in becoming a Dark Sky Park, Muir says “the difference is already noticeable in many areas of the region; where once the Milky Way was invisible it is now visible.”

Exmoor National Park, an International Dark Sky Reserve

Increased outreach activities and new dark-sky programming are among the 2013 highlights at Exmoor National Park in England. “Dunkery By Moonlight,” a popular annual walk led by National Park Rangers, now includes an introduction to the park’s dark night skies. Community organizations and tourism providers routinely host public stargazing events, and Exmoor published a new observer’s guide for Park visitors. In September, a local art exhibition at Dulverton called “Dark Starry Skies” celebrated Exmoor being named an International Dark Sky Reserve.

New conservation work at Exmoor includes an initiative spearheaded by the U.K. Bat Conservation Trust to bet-

ter assess the effect of light pollution on bats. Park staff also received 10 new Sky Quality Meters (SQMs) to use as part of a coordinated effort to monitor night sky brightness. According to Emma Dennis, conservation advisor at the park, the IDA designation has “made a huge impact” on Exmoor by generating “a great deal of interest” from locals and visitors.

Natural Bridges National Monument, an International Dark Sky Park

Natural Bridges in Utah, the world’s first International Dark Sky Park, was designated by IDA in 2006. Over the years, the park has experienced a marked increase in foreign visitors, particularly from Asia and Europe. In response, the park developed materials on dark sky issues specific to those continents. Other dark-sky educational materials are on display in the Visitor’s Center, as well as their IDA award certificate. Despite the Monument’s remote location, 751 visitors attended events in 41 individual programs in 2013, each of which included a dark-sky conservation message.

Gordon Gower, Natural Bridges “Sky Ranger” and Visitor Use Assistant, says

that dark skies are now firmly part of the monument's public identity. "The Natural Bridges dark-sky reputation is spreading, and we were mentioned in several national publications this year," he explains. "The most frequent email request we receive is for information on our dark sky program."

Innovation and Research

The successes detailed above illustrate our ideal outcome: the IDA designation is not simply the end product of a demanding application process. Rather, it represents sustained commitment that helps solidify night sky protection as an important global conservation and education issue. A designation is also the beginning of what we hope is a long and productive partnership with IDA. The program is among the most effective means for furthering IDA's mission throughout the world. Every year, hundreds of thousands of visitors arrive at these destinations and learn about dark skies and IDA. Some are inspired enough to support IDA and to fight for dark skies in their own communities.

In the course of managing the IDSP Program, I have considered its global impact on dark-sky awareness and good lighting practices and come up with several questions for further research. Often one of the motivations to seek an IDSP designation is to increase local tourism. Anecdotal evidence suggests that IDA recognition does benefit tourism, but hard data are lacking. Soon, we will learn the results of the first study attempting to quantify the impact of an IDSP designation on the local economy in and around Galloway Forest Park.

Other questions that need investigation are 1) Do IDSPs stay dark after receiving IDA designations? and 2) Do they actually become *darker* as the result of properly implemented light-scape management plans? We want to find answers that are data-driven in hopes the results will be useful in scholarly studies on the social and environmental effects of light pollu-

Every year, hundreds of thousands of visitors arrive at these destinations and learn about dark skies and IDA. Some are inspired enough to support IDA and to fight for dark skies in their own communities.

tion. These are areas in which IDA can become an important contributor.

Future of the Program

We need to bring the IDSP Program to the developing world. Developing nations present a challenging paradox: while they contain some of the darkest locations on the planet, they may be the most difficult to protect. We are faced with the perception that a rising standard of living associated with economic development entails bright outdoor lighting. As citizens of developing nations look to brightly-lit Western models of nighttime outdoor spaces, how will we frame the argument that people in Africa, Central Asia or rural China should value dark skies as highly as clean air and water? Can we convince them of future economic benefits to be gained by protecting this resource now? We cannot merely deal with the existing problem of light pollution in industrialized countries while allowing it to *become* a problem in those less developed. By focusing attention on the developing world, we have a chance to position ourselves "ahead of the curve" before night skies are critically endangered. IDA stands on the threshold of an unprecedented opportunity to affect major worldwide change.

We are also thinking about how to make the program more inclusive

of locations whose dark skies face no imminent threat. These are among the most isolated places on Earth, in terms of distance from significant sources of artificial light and major modern infrastructure. However, the current philosophy underlying the program envisions rewarding efforts of individuals and organizations for protecting places under *current* threat of light pollution. If we have little to offer "safe" dark locales, the public may reasonably question what we mean by the term "Dark Sky Place." As a result, we are beginning to explore ways to sensibly broaden the scope of the program to offer some recognition to the most remote sites that may not face threats for years or decades to come.

This is an important step. An IDSP designation can help mitigate threats before they become a crisis and require more intense intervention. In much the same way that governments name national parks and wildlife preserves in the absence of acute threats, recognizing the dark night skies over a particular place may serve to highlight vulnerability, even if IDA recognition lacks the legal muscle to enforce regional conservation policies. This approach is consistent with the IDA mission to "protect the nighttime environment" by pointing out instances where that environment is significant yet fragile. It shows that the world is watching the actions of governments and property owners as they make future decisions about land development and outdoor lighting. The program can be both reactive *and* proactive at the same time.

More than a decade on, the International Dark Sky Places Program shows leadership by example and, fittingly, now has competition abroad. Under the assumption that imitation is the sincerest form of flattery, we know we are doing something right. Now is the time to capitalize on that attention, think big and move the program forward toward new kinds of territory in new parts of the world. Stay tuned – the best is yet to come!

IDA Québec Celebrates 10 Years!

IDA Québec celebrated its ten-year anniversary on December 4, 2013, at the Montreal Planetarium. IDA Executive Director Bob Parks joined the celebration along with 40 other guests.

The celebration kicked off with the IDA Québec President Mihai R. Pecingina, who discussed the negative effects of light pollution and announced the chapter's proposal for a new lighting regulation based on the IDA/IESNA Model Lighting Ordinance.

Pecingina also paid tribute to IDA Québec's founders. "Just like us, they like to look up to the sky," he said. "However their feet are still on solid ground. To be able to dream we need a solid foundation. They gave us a solid foundation with an idea. We need to respect our sky, our values and our loved ones."

A piece of amazonite from the north of Québec was offered to each of the founding members in attendance. "Each of you, dear founding members, has brought a different contribution to the solid base that IDA Québec is built on," Pecingina explained. "It is the reason all pieces are different, and they are as polished as the ideas you have given us." IDA Executive Director Bob Parks presented each of the founding members a certificate for their commitment to dark skies.

An amazonite piece was also awarded to IDA, "which propelled this idea into the world," according to Pecingina. The last piece will be kept by IDA Québec "because the members need never forget the original idea, the mantra of

the organization: increase awareness, preserve and protect the nighttime environment and our heritage of dark skies," explained Pecingina.

Parks gave a presentation *The Future of Outdoor Lighting*, and afterward guests were invited to attend one of the planetarium's shows.



Several IDA Québec co-founders (left to right), Rémi Lacasse, Germain Gauthier, Gilles Meunier, Chrisnel Blot and Richard Poirier, receive pieces of amazonite from north Québec to represent the "solid base" that IDA Québec is built on. PHOTO CREDIT: BOB PARKS

Malibu Community Alliance Holds Fundraising Event for IDA

On December 12, 2013, the Malibu Community Alliance (MCA) held a fundraising event in Malibu for the International Dark Sky Association. The MCA was founded in 2012 to encourage the protection of the night sky in



Malibu, California. Installation of sports lighting at a local high school galvanized the group into action when light trespass invaded backyards of nearby residents. In April 2013, the Malibu City Council voted unanimously to explore the use of the IDA/IESNA Model Lighting Ordinance (MLO). A Request for Proposal has been issued and Malibu is seeking professional assistance to develop its new lighting standards.

In May 2013, Cami Winikoff, of the MCA, began planning the event, which was held at the Sunset Restaurant on the beach in Malibu. Approximately 90 people attended the fundraiser that included an emcee, hors d'oeuvres and talks by IDA Executive Director Bob Parks, IDA Board Member Jim Benya, former IDA Board Member Nancy Clanton and Debra Burnette. Celestron provided a telescope for attendees to stargaze and donated a CPC 9.25" GPS telescope for the raffle. Proceeds from the event will be used to promote adoption of a lighting ordinance based on the MLO and for IDA education programs.

Malibu Community Alliance Member Cami Winikoff (fourth from left) organized a fundraiser on behalf of IDA. PHOTO CREDIT: BOB PARKS

NASA Astronaut Dr. Story Musgrave Becomes IDA Dark Sky Ambassador

IDA is excited to announce Dr. Story Musgrave, one of NASA's most experienced astronauts, as our newest IDA Dark Sky Ambassador. The program enlists prominent individuals on the public stage to help raise awareness of IDA's mission. Musgrave joins the ranks of such luminaries as the late science fiction writer Sir Arthur C. Clarke and Bill Nye "the Science Guy" of the Planetary Society.

During Musgrave's distinguished 30-year career with NASA, he logged 25 million miles in orbit during six space missions, and worked part-time as a trauma surgeon and university instructor. A true Renaissance man, Musgrave is also a pilot, mechanic, photographer, philosopher and poet.

Although he never finished high school, Musgrave holds six academic degrees including a doctorate of medicine, and has published more than 40 scientific papers on topics such as aerospace medicine, exercise physiology and clinical surgery.

Growing up on a Massachusetts dairy farm, Musgrave found an affinity for understanding how systems work from farm machinery to the natural world around him. From an early age he had a love of nature and flying. He took his first solo flight at age 16 after learning to fly at a nearby farm.



Dr. Story Musgrave (right) met with Bob Parks at the Dark Sky Festival in Harmony, Florida, on March 1.

In 1953, shortly before he was to graduate, he left school to join the U.S. Marine Corps. Ten years later, he had earned four of his six degrees including his doctorate, and went on to work as a post-doctoral fellow for the U.S. Air Force and the National Heart Institute,

and complete a Masters of Science degree in physiology and biophysics in 1966.

In 1967 he and ten others were selected from 4,000 applicants to become NASA's first cohort of scientist-astronauts. Musgrave worked on the Apollo program and subsequent moon landings, and helped design and develop the Skylab space station and extravehicular activity equipment including space suits and life support systems for the Space Shuttle program. Sixteen years after his NASA appointment, he finally made it into space, riding on Space Shuttle Challenger's maiden voyage.

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Photo by Paul Gardner

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National Media Coverage Increases Public Awareness of Light Pollution

Thanks to recent national and international media coverage, IDA's message about light pollution and smart lighting solutions is reaching more people than ever before. IDA is on the edge of achieving mainstream public awareness for the first time in its history!

In early September, light pollution was featured on the National Public Radio program *The Diane Rehm Show*. The one-hour segment, "Environmental Outlook: Combating Light Pollution," featured a great line-up of guests including IDA Executive Director Bob Parks; IDA Board Member Dr. Mario Motta; Paul Bogard, author of *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*; and Mary Stewart Adams, program director of Headlands International Dark Sky Park.

The December 2013 issue of *Men's Journal* published "Where did all the stars go? – How Light Pollution is Stealing the Night," a comprehensive nine-page article providing detailed information on IDA, the negative impacts of light pollution on wildlife and human health, the importance of dark skies, and lighting solutions. It also includes great graphics and extensive interviews with IDA Executive Director Bob Parks and Bill Wren of the McDonald Observatory, among others.

The appearance of the story prompted CBS *This Morning Saturday* to do a live interview with Bob Parks on November 30, 2013. The five-minute segment, "How Bad is Light Pollution?" provided a quick and concise overview on light pollution and lighting solutions.

In early December, IDA issued press releases and conducted several media interviews in conjunction with the announcements of two new International Dark Sky Places (IDSP) – Northumberland International Dark-Sky Park in the United Kingdom and the Isle of Coll International Dark-Sky Community in Scotland. The Northumberland announcement in particular created one of the largest news events in the program's history. The media coverage included a story in Britain's *The Guardian* newspaper, with a weekly worldwide readership of 5.8 million people and an interview with IDA's Scott Kardel on the BBC *Newsnight*, which has an estimated worldwide audience of more than 43 million listeners.

IDSP Program Manager John Barentine also was interviewed including being a guest on two BBC radio shows, *The Mark Forest Evening Show* and *Up All Night*. Other media highlights from the December announcements include articles in *The Times* (London), the *Daily Mail*, *The Financial*



Times, and segments on television news programs the BBC *Looks North*, *Tyne & Wear* and *CNBC World*.

In late December, the *Financial Times* interviewed Scott Kardel for its article "Embrace the darkness – and fight bright light at night, A global campaign against excessive illumination is gathering pace." Stay on the lookout for upcoming articles in the *New York Times* and an interview with Bob Parks in *The Atlantic Magazine*.

To read the *Men's Journal* article, go to: <http://tinyurl.com/nclz8k6>.
To see the CBS *This Morning Saturday* interview, go to: <http://tinyurl.com/q597cru>.

Dr. Story Musgrave

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The 1993 mission of the Shuttle *Endeavour* is perhaps Musgrave's most well-known. After more than a year of intense training and a record five spacewalks, the *Endeavour* crew made history by installing corrective optics in the Hubble Space Telescope.

Musgrave retired from NASA in 1997. Today he travels the globe sharing his unique experiences and advocating for continued space exploration. At home he runs his Florida palm tree farm. His recreational interests include flying, photography, scuba diving, parachuting, gardening and running.

Other IDA Dark Sky Ambassadors are filmmaker Ian Cheney, Geoffrey Notkin of "Meteorite Men," National Park Service "Dark Ranger" Kevin Poe, and Astrophysicist Lucianne Walkowicz.



2013 IDA Annual General Meeting

In November, the 2013 IDA Annual General Meeting (AGM) and conference *IDA at 25: Lighting Advocacy Past, Present, and Future* was a great success and lots of fun. The AGM, held at the eclectic Aloft Tucson Hotel in Tucson, Ariz., brought together a wide-range of dark sky advocates to discuss night sky preservation. More than 50 participants came from across the United States and the globe to discuss the latest developments in light pollution research and mitigation, lighting solutions, legislation and design. The daylong conference included 13 presenters, breakout sessions, an award ceremony and a reception.

At the award ceremony, J. Kelly Beatty was presented with IDA's Hoag-Robinson Award for his impressive efforts promoting state and municipal outdoor lighting ordinances in Massachusetts, outstanding service to the IDA board and furthering light pollution awareness through his writing, talks and numerous media interviews.



Reginald Wilson (left) receives the Dr. David L. Crawford Lifetime Achievement Award from IDA co-founder David Crawford.

Reginald Wilson received the Dr. David L. Crawford Lifetime Achievement Award for his unrelenting 40-year fight against light pollu-



Tim Hunter (left) and David Crawford, who co-founded the International Dark-Sky Association in 1988 to combat light pollution, were reunited at the AGM.

tion. "Reg" has dedicated his time and exceptional talents as a member of the IDA board of directors and head of IDA Australia/Asia-Pacific Regional Office.

To watch presentations from the 2013 AGM, go to <http://goo.gl/Y1I1bl>, and click on the name of the presenter.

IDA Welcomes New and Returning Board Members for 2014

Last fall, the IDA membership reelected Martin Morgan-Taylor and Leo Smith to the IDA board of directors. Additionally, two new members, Scott Roberts and Nels Leutwiler, were appointed by the board.

Martin Morgan-Taylor is a principal lecturer in law at the De Montfort University School of Law in England. He is involved in the continuing review of U.K. planning and environmental laws regarding provisions to mitigate light pollution. He also advises central and local governments as well as the U.K. Campaign for Dark Skies and the Society for Popular Astronomy. He publishes and organizes conferences

on light pollution and the law and has recently carried out a U.K. survey about perceived nuisances caused by artificial lighting. In 2013 he worked with the English government to publish a guide on light pollution and planning. Martin is also the 2011 recipient of the IDA Galileo Award for outstanding achievements in combating light pollution in Europe.

Leo Smith is president of Capital Ventures Group of Suffield, Connecticut. He is a lifetime member of IDA and serves as the IDA northeastern regional director and as the IDA Connecticut chapter leader. He is a member of both the Illuminating Engineering

Society and the Standard Practice Subcommittee for Roadway Lighting. He served on the IDA/IESNA Joint Task Force, which was responsible for developing the Model Outdoor Lighting Ordinance. His successful campaign to reduce utility rates for part-night lighting led to the adoption of part-night public lighting in Connecticut and New Hampshire. He also was instrumental in getting Lowe's Home Improvement to carry a selection of Dark Sky Friendly fixtures in all of its stores.

Scott W. Roberts is a supporter of outreach in astronomy and space exploration, and a popularizer of

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IDA Awarded Night Sky Brightness Measurement Contract

In December 2013, the International Dark-Sky Association was awarded a contract to measure night sky brightness levels at Pepperdine University in California. IDA is working with Clanton and Associates on a campus-wide outdoor lighting redesign and modernization project. Night sky brightness levels are measured employing our new DSLR-based system that uses a fisheye lens to

capture an all-sky image with one exposure. Pictures are then converted to luminance-calibrated images using software developed by IDA Hungary Chapter Leader Zoltán Kolláth.

IDA is working with the National Park Service to incorporate their new Sky Quality Index (SQI) that will grade the image on a scale of 1-100. This will allow the rating to be used as a baseline night sky brightness level before

the lighting upgrades are installed. After installations are complete, IDA will return to take measurements at the same locations under identical conditions, which will allow us to evaluate the reduction in skyglow due to improved outdoor lighting. To the best of our knowledge, this will be the first time that this process has been used for this purpose.

Panoramic nighttime view of the soccer field at Pepperdine University, Calif. PHOTO CREDIT: BOB PARKS



Board Members

CONTINUED FROM PAGE 17

amateur astronomy. Since the early 1980s, he has engineered and promoted star party events and telescope viewings for broad audiences. He is the recipient of numerous awards for astronomy outreach including the Astronomical League Special Award and the RTMC Astronomy Expo G. Bruce Blair Medal. Scott has worked with Meade Instruments and Oceanside Photo & Telescope (formally Oceanside Photographic Center) and is the founder of Explore Scientific, an astronomical instruments manufacturing company, and the Astronomy

Outreach network, which supports individuals and organizations committed to educational public outreach in astronomy.

Nels Leutwiler is a lawyer, businessman and philanthropist. With his wife Elizabeth Taylor Leutwiler, he runs the Nels & Liz Leutwiler Foundation that supports educational, environmental and social service causes. As a six-year member of the Sierra Club Foundation Board of Directors, he acted as vice chair, treasurer, secretary and chaired several committees. He also was vice president for the Lake County, Illinois Habitat for Humanity and member of the Lake County Forest Preserve District Preservation

Foundation Board of Directors. He has practiced law in Colorado and Alaska and was CEO/Chairman of Parkview Metal Products, a manufacturer of components for electronic applications. Currently, he is founder and president of Ridgeline Holdings, a company that purchases, renovates and rents housing in the Chicago area.

Members of the IDA board also elected the executive committee: Jim Dougherty as president, Kelly Beatty as vice president, Connie Walker as secretary and Chris Monrad as treasurer. Tim Hunter as past president serves as a non-voting *ex officio* member of the executive committee.

IDA Chapter News

IDA TOKYO

On December 5, IDA Tokyo had its first general meeting since its establishment in January 2013. Nobuaki Ochi, chapter leader for IDA Tokyo brought together a diverse group of advocates that included lighting designer Kaoru Mende, who also presented at the Noche Zero light pollution conference in Chile; Hide Ozawa, a night sky guide from IDA's Aoraki Mackenzie International Dark Sky Reserve; and animal photographer Rei Ohara, who was featured in the movie *Brilliant Darkness*. The group discussed public outreach, chapter expansion and light pollution assessment.

IDA SAN DIEGO

On January 27, IDA San Diego held a free public forum on light pollution at the Palomar College Planetarium. Presentations were held on light pollution, lighting ordinances, and IDA International Dark Sky Places in Southern California.

Presenters included David Crawford, IDA co-founder; Paul Ericson, former IDA board member and professional lighting designer; Steve Flanders, of the Palomar Observatory; and Sally Theriault, of Borrego Springs Dark Skies. IDA San Diego Chapter Leader Lisa Bruhn presented the chapter's annual local lighting awards.

IDA SOUTH FLORIDA

In December, IDA South Florida hosted a free public screening of the award-winning PBS film *The City Dark*. It was followed by a lively panel discussion by officials from the Palm Beach Environmental Resources Management, the Gumbo Limbo Nature Center and IDA South Florida. One of the panelists, Dr. Kirt Rusenko, a sea turtle expert, was featured in the film.

Also in December, IDA South Florida attended the Big Cypress Swamp Heritage Festival, a celebration of the history and culture of South Florida and its beautiful dark night skies. Chapter members educated attendees about the negative effects of urban light pollution on the Everglades and the value of preserving its dark skies.

In January, the chapter exhibited at the Everglades Coalition Annual Conference. The event was attended by Secretary of the Interior Sally Jewell; Former Governor and Senator Bob Graham; superintendents from three national parks; and leaders of several prominent environmental conservation groups.



Some of the members of the IDA Tokyo chapter (from left to right), Takahiro Ueno, Nobuaki Ochi, Fumiki Onoma, Noriko Higashi, Kaoru Mende and Miyuki Miyazawa.



Left to right: IDA South Florida member Diana Umpierre, Collier County Commissioner Tim Nance, Big Cypress National Preserve Superintendent Pedro Ramos, and IDA South Florida Chapter Leader Bryan Bodie at Everglades Coalition Annual Conference.

JOIN US! Become an integral part of IDA's success and consider forming a chapter in your area. No experience necessary! The only qualification is a passion to advocate for keeping the night skies natural. Contact ida@darksky.org for more information.



IN MEMORIAM



Joe Orr, Longtime IDA Suporter

Joseph Newton Orr, river guide, nature and dark sky enthusiast and philanthropist, passed away December 9, 2013. During his long career as a river guide, Joe traveled extensively throughout the United States and Central America. His career allowed him to bridge two of his passions – sharing the natural world with others and a life-long love of learning.

Joe's extensive knowledge of the ancient Mayan culture educated countless tour participants about the Mayan's relationship with the natural world, including the night sky which he loved. As a child, he enjoyed telescopes and searching the night skies of Floresville, Texas.

Following his mother's death in 1993, Joe took over management of his portion of the Butler Ranch in Karnes County. He converted the land from agricultural to wildlife management, hoping to return it to its original natural vegetation and wildlife condition.

That same year, Joe became a member of IDA. During his last years, Joe enjoyed travel and philanthropy and made generous contributions to IDA and other astronomy and environmental organizations including the University of Texas (UT) McDonald Observatory, the Department of Astronomy at the University of Texas, the Lowell Observatory in Flagstaff, Arizona, the Grand Canyon Association in Arizona, and the Lady Bird Johnson Wildflower Center in Austin, among others.



In a 2013 interview for the newsletter of the McDonald Observatory Board of Visitors, of which he was member, Joe explained his passion for the preservation of dark skies: "I believe it's important to have a place where people can look up at an unpolluted night sky to experience the awe and wonder that others have felt for millennia and perhaps to think about our place in the Universe." Joe relished the endless mysteries of the Universe and maintained an insatiable curiosity until his last days. He never stopped learning.

The Loss of the Night App is Now Available in 11 Languages

The Loss of the Night app helps users measure how the brightness of the night sky changes over time, as lighting technologies change and cities grow. No prior astronomical experience is necessary. Previously only available in English and German, the app is now offered in Arabic, Catalan, Chinese, English, French, German, Italian, Japanese, Polish, Romanian and Spanish.

The app works by interactively directing users to individual stars, and asking whether they can see the star or not. By determining what the faintest visible star is, researchers learn how many stars are visible at that location, and by extension how bright the sky is.

The app is an extension to the "Globe at Night" citizen-science program (see story on the facing page), which has been running since 2006.

It is based on the Google Sky Map application, and is currently available for Android phones. The "Loss of the Night" app can be downloaded free of charge at the Google Play store here: <http://bit.ly/1cx6CcM>. Be sure also to check out the Loss of the Night citizen science project blog: <http://lossofthenight.blogspot.com>.

The First International Conference on Artificial Light At Night Held in Berlin

Last October light pollution researchers from across the globe gathered in Berlin, Germany to attend the first International Conference on Artificial Light At Night (ALAN). Verlust der Nacht and IDA co-sponsored the three-day event.

Presentations and poster papers covered virtually all issues related to light pollution with presenters coming from dozens of countries, representing four continents. The major topics of the conference were Technology and Design, Biology and Ecology, Society, and Health. IDA was well represented, with talks given by Executive Director Bob Parks and Board Members Chris Kyba, Martin Morgan-Taylor and Connie Walker.

Notable experts gave plenary talks that related ALAN to biodiversity loss, human health, satellite monitoring, lighting design, sustainability, ordinances, dark sky places, and the need for more research.

Many also attended an optional nighttime guided tour of Westhavelland Nature Park, which was designated an International Dark Sky Reserve as this issue was going to press. The tour was a big hit as rain and clouds parted in time to show off some of the darkest skies in all of Germany. Westhavelland was the site of one of the conference's several evening flash mob sessions for measuring night sky brightness with smart phones.

Please plan to attend ALAN 2014 in Leicester, U.K, September 2-4.



Bob Parks, Chris Kyba, Connie Walker and Martin Morgan-Taylor at the ALAN conference

Mark Your Calendars for the 2014 Northeast Astronomy Forum

The 2014 Northeast Astronomy Forum (NEAF), the world's largest space and astronomy event, will be held April 12-13 at Rockland Community College in Suffern, N.Y., just 28 miles north of New York City. The astronomy expo will include world-renowned speakers, exclusive product showcases, daily NEAF solar star parties, the 2nd annual N-PAC Northeast Pro/Am Conference, beginner classes, family activities and hourly door prizes. IDA will be giving daily light pollution updates in the Galaxy Theater as well as providing information at our IDA booth. Come visit us! For more information and to register, go to: <http://www.rocklandastronomy.com/neaf/>.

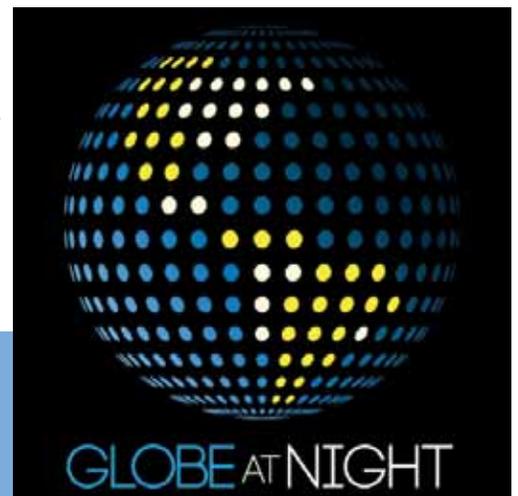
Help Collect Data on Light Pollution – Dates Set for the 2014 Globe at Night Program

The 2014 Globe at Night program, an international citizen-science campaign, is now collecting data during all 12 months of the year. The program helps raise public awareness on the impact of light pollution. Anyone can participate. Just following the instructions on the Globe at Night website and submit your data via computer or smart phone.

The 2013 campaigns resulted in 16,342 data points submitted from 89 countries. Nearly 100,000 measurements have been contributed from people in 115 countries during the campaigns each winter/spring over the last eight years. To learn more about the program and explore an interactive map based on eight years of data, go to the Globe at Night website at www.globeatnight.org

Campaigns for the rest of 2014 are being held on the following dates:

- March 21-30
- April 20-29
- May 19-28
- June 17-26
- July 16-25
- August 15-24
- September 15-24
- October 14-23
- November 12-21
- December 11-20





International Dark-Sky Association 2013 Annual Report



Last year IDA celebrated a quarter century of protecting the nighttime environment. In 25 years we have accomplished a lot to preserve starry night skies, and 2013 was no different! We had a busy and exciting year of progress on several fronts.

FLORIDA SEA TURTLE HABITAT RESTORATION PROJECT

Through the Florida sea turtle habitat restoration project, we are helping to protect nesting sea turtles from potentially deadly artificial lighting. Last year we conducted lighting surveys of nearly 100 miles of the Florida coastline and are making lighting recommendations to enhance sea turtle protection. The project stems from a contract with Florida Department of Environmental Protection and the Florida Fish and Wildlife Conservation Commission to evaluate artificial lighting that could impact sea turtle nesting habitats within and adjacent to 25 local, state and federal conservation lands in the Florida Panhandle. In August of last year, IDA began conducting extensive surveys and providing lighting retrofit recommendations to replace existing exterior lights with fully shielded, long wavelength fixtures.

Turtle-friendly lighting includes fixtures that are designed to keep light pointed downward and light sources that limit the spectrum of light emitted. When used properly, these lights provide illumination for human safety without negatively impacting sea turtle populations. We are also working with lighting manufacturers to create turtle-friendly lighting fixtures based on our recommendations.

INTERNATIONAL DARK SKY PLACES (IDSP) PROGRAM

This successful program continues to expand and protect dark skies across the globe. In 2013, IDA welcomed six new International Dark Sky Places. IDA also revised the IDSP guidelines in 2013 to incorporate the new standards and improve the application process. Interest in certification is at an all-time high and growing

international recognition garners increasing global media coverage on light pollution. For more information on the IDSP program, see "IDA Welcomes Four New International Dark Sky Places" on page 9 and "IDSP Program: What's New and on the Horizon" on page 11.

FIXTURE SEAL OF APPROVAL (FSA)

The fixture Seal of Approval program encourages lighting manufacturers to submit their fully shielded fixtures for certification by IDA. In response to the latest research on the harmful effects of light at night, IDA revised the FSA program in 2013 to include new requirements on the spectrum of light and over 450 fixtures are currently approved. These spectral requirements will be further tightened in the future. The FSA website includes an online search feature available on our website that allows consumers to find the most ecologically responsible outdoor lighting solutions. In 2014, IDA will also begin certifying turtle-friendly lighting.

EDUCATION AND OUTREACH

IDA's short film on light pollution, "Losing the Dark," premiered last year and continues its tremendous success raising global awareness and inspiring public involvement. It has since been translated into 11 languages, and viewed or downloaded more than 40,000 times. Translations were funded in part through a new crowd-sourcing fundraising model Indiegogo in which we raised approximately \$4,600.

The conference theme of the 2013 IDA Annual General Meeting (AGM) IDA at 25: Lighting Advocacy Past, Present and Future. The meeting was a return to an old-school style AGM for the first time in several years. Attendance at the meeting exceeded expectations and the event

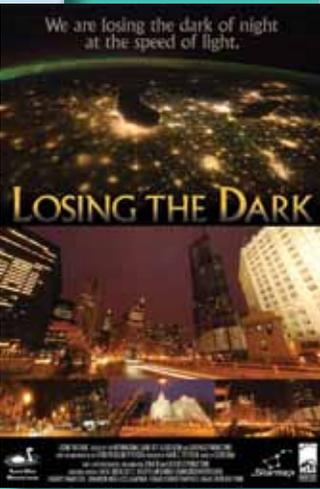
was well received by all. To learn more about the meeting, read "2013 IDA Annual General Meeting" on page 17.

The first international interdisciplinary conference on Artificial Light at Night (ALAN) was a great success. Co-hosted by IDA and the German organization, Verlust der Nacht, the Berlin conference brought together scientists from across the globe to present the latest research on light pollution. This annual conference promises to further light pollution research for years to come. See "The First International Conference on Artificial Light At Night Held in Berlin" on page 21 for more information about the conference.

IDA participated in several other important conferences and events providing booths, speakers and more. Some highlights include the Sea Turtle Symposium, Dark Sky Festival in Harmony, Fla., IDA Québec's Ten-year anniversary celebration, the CIE conference in Paris, the Northeast Astronomy Forum, Light Fair, the 13th annual European Symposium for the Protection of the Night Sky, and the Arizona Science and Astronomy Expo.

Last year, IDA worked with Nancy Clanton, a professional engineer and president of Clanton and Associates, a lighting design firm in Boulder, Colo., to create three IES/IDA Model Lighting Ordinance training videos. The videos are now available to the public via YouTube.

In 2013, we added six new chapters, half of which are international. Chapters were added in South Korea, Mexico, Toronto, Phoenix, and two chapters were added in Utah. Two of our Florida chapters combined to pool resources to fight light pollution more efficiently. We also added a new Dark Sky Ambassador. Renowned astronaut Dr. Story Musgrave has graciously agreed to spread the word about



light pollution. To read about Musgrave's interesting life, see "NASA Astronaut Dr. Story Musgrave Becomes IDA Dark Sky Ambassador" on page 15.

MEDIA & COMMUNICATIONS

Last year IDA received extensive national and international media coverage. Highlights include an exhaustive feature article in *Men's Journal*, articles in *The Guardian*, *The Times* (London), the *Daily Mail*, *The Financial Times*, and guest appearances on *CBS This Morning Saturday*, the *Diane Rehm Show* and the *BBC Newshour*. See "National Media Coverage Increases Public Awareness of Light Pollution" on page 16 for more details about IDA's media coverage.

Our followers on both Facebook and Twitter nearly doubled. At year's end, we had nearly 20,000 followers on Facebook and just over 3,000 on Twitter. IDA's bi-monthly e-newsletter *Night Watch* continues to gain subscribers. Its open rate consistently hovers around one-third, far higher than the nonprofit industry average of just above 20 percent.

Last fall we were also able to hire two new staff members: John Barentine as program manager and Cheryl Ann Bishop as communications and public affairs director. As we move forward on several exciting new initiatives, we are keeping them busy.

In 2014, IDA will be launching the Save Our Stars program as well as the Smart Urban Lighting (SUL) initiative, and working with Pepperdine University in California to measure night sky brightness levels. To learn more about the SUL Initiative, read "The Smart Urban Lighting Initiative" on page 2. For more details about Pepperdine, read "IDA Awarded Night Sky Brightness Measurement Contract" on page 18.

2013 IDA Profit & Loss Statement

INCOME

Annual Membership Dues	223,611
Corporate Partnerships	151,750
Consulting Income	111,840
Grant Income	67,992
Donations	62,361
Personal Donations	37,192
FSA Fees	16,300
Miscellaneous Income	5,440
In-Kind Donations	5,300
Meeting Income	1,176

GROSS INCOME \$682,962

EXPENSE

Labor	377,128
Outreach and Education	80,833
Office Expense	64,506
Special Projects	56,608
Miscellaneous	7,461
Chapters	1,470

TOTAL EXPENSE \$588,005

NET INCOME \$94,956

The International Dark-Sky Association extends its appreciation and thanks to all who generously support our mission.



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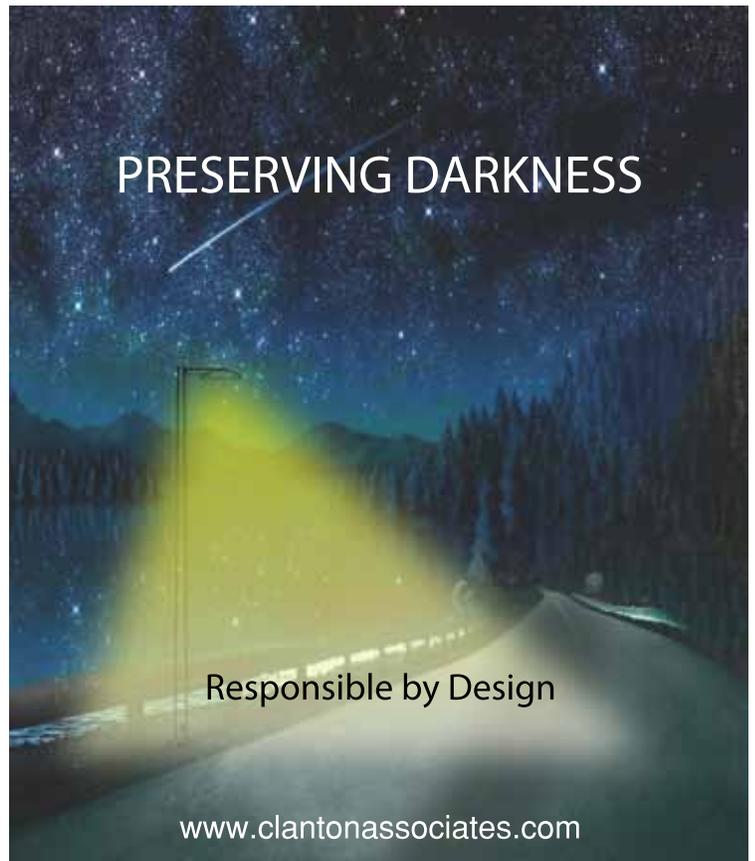


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