UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN RONGLIDA TECHNOLOGY CO. LTD.,

Petitioner,

v.

PATHWAY IP LLC,

Patent Owner.

Case IPR2025-01231

U.S. Patent No. 7,841,729

EXHIBIT 1017
DECLARATION OF P. MORGAN PATTISON, PH.D.
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 7,841,729

I. INTRODUCTION

I, P. Morgan Pattison, Ph.D., declare as follows:

1. My name is Morgan Pattison. I have over (25) years of experience in the areas of light emitting diodes (LEDs), organic light emitting diodes (OLEDs), lighting, solid state lighting (SSL), displays, lasers, and optoelectronic materials and devices. I am a Fellow of the Illuminating Engineering Society and was selected based on my contributions to commercialization of energy saving LED based lighting.

2. I have been retained by SHENZHEN RONGLIDA TECHNOLOGY CO. LTD. d/b/a ShutterLight ("Petitioner") in connection with the petition ("Petition") for Inter Parter Review (IPR) of U.S. Patent No. 7,841,729 (the "'729 patent"), captioned *SHENZHEN RONGLIDA TECHNOLOGY CO. LTD. (Petitioner) v. PATHWAY IP LLC (Patent Owner)*, to provide my expert opinions concerning the validity of the claims of the '729 patent.

3. I am being compensated at my hourly consulting rate of $550 for my time. My compensation is in no way contingent on the content of my testimony or the outcome of these or any other proceedings relating to the '729 patent. I have no other financial interest in this proceeding.

4. It is my opinion that claims 1-13 of the '729 Patent are unpatentable as obvious to a person of ordinary skill in the art ("POSITA").

II. EDUCATION BACKGROUND, PROFESSIONAL EXPERIENCE, AND OTHER QUALIFICATIONS

5. My curriculum vitae ("CV") is attached hereto as Attachment A and provides an accurate identification of my background and experience.

6. I am the Founder and President of Solid State Lighting Services, Inc. In this capacity, I provide technical, strategic, and market expertise to clients in the areas of light emitting diodes (LED), organic light emitting diodes (OLED), lighting, solid state lighting (SSL), displays, and optoelectronic materials and devices. I also connect optical device technical performance with application requirements for displays, general illumination, and various novel lighting applications enabled by SSL technology. I also develop lighting technology and practices for horticultural production, animal husbandry, and wildlife and light pollution effects mitigation.

7. From January 2006 through November 2007, I worked as a Project Manager at the U.S. Department of Energy (DOE). In that capacity, I was responsible for managing DOE funded research and development projects in SSL, including LED and OLED lighting technologies. My duties included managing the solicitation, selection, and progress of lighting R&D projects with the objective of saving energy. As part of the solicitation and selection process, I evaluated and identified priority areas of research necessary for advancement of SSL in terms of efficiency, lighting performance, and cost.

8. From September 2000 through January 2006, I was a Graduate Student Researcher at University of California Santa Barbara (UCSB). I performed my Doctoral thesis research under Professor Shuji Nakamura (Nobel Prize in Physics 2014) on gallium-nitride (GaN) based micro-cavity LEDs. The research included: epitaxial structure design and growth by metal-organic chemical vapor deposition (MOCVD), semiconductor process development, materials characterization, and electro-optical device characterization. While at UCSB, I participated in additional areas of research, including research and development of ultraviolet (UV) LEDs, vertical cavity surface emitting lasers (VCSEL), and edge emitting laser diodes.

9. From November 1996 through May 2000, I worked as a Laser Test Engineer at Cymer Laser. I was responsible for testing and developing test methodology for production and prototype krypton fluoride (KrF) and argon fluoride (ArF) excimer lasers used in deep UV photolithography for manufacturing of advanced semiconductor products. Testing included optical characterization and full system troubleshooting. I also developed new electrical and optical test methodologies to improve test cycle times, automated test procedures, and developed test documentation.

10. I earned a Ph.D. in Materials Science, Electronic and Photonic Materials from the USCB in 2006. As stated above, my graduate work focused on

development of Fabrication and Characterization of Gallium Nitride Based Micro-Cavity LEDs.

11. I obtained a Master's Degree in Electrical Engineering, Electronics and Photonics from UCSB in 2003.

12. I obtained a Bachelor's Degree in Electrical Engineering, Electronic Devices and Materials from UC San Diego in 1996.

13. I am listed as an inventor on at least 11 issued patents, including multiple patents in the field of LED materials and device design, LED lighting product design, and home automation and controls for lighting.

14. I have authored numerous peer reviewed journal articles and publications on the topics of LED materials and device design.

15. Since 2008, I have also authored annually updated R&D and technology and manufacturing roadmaps used by the DOE to guide federal lighting R&D efforts. I frequently give presentations and talks on the topic of LED technology, SSL status and R&D opportunities, and application advancements enabled by LED technology.

III. ASSIGNMENT AND MATERIALS CONSIDERED

16. I have been asked to provide analysis and explain the subject matter of the '729 patent, including the state of the art when the application underlying the

‘729 patent was filed. I have also been asked to consider, analyze, and explain certain prior art to the ‘729 patent including how that art relates to the challenged claims of the ‘729 patent and to provide my opinions regarding whether that art invalidates the claimed subject matter.

17. The opinions expressed in this declaration are not exhaustive of opinions I may offer in the future regarding the unpatentability of the claims of the ‘729 patent. Therefore, the fact that I do not address a particular point should not be understood to indicate an agreement on my part that any claim complies with the requirements of any applicable patent or other rule.

18. I reserve the right to amend and supplement this declaration with additional evidence, arguments, or testimony presented during this IPR or related proceedings on the ‘729 patent.

19. In forming the opinions set forth in this declaration, I have considered and relied upon my education, knowledge of the relevant field, knowledge of scientific and engineering principles, and my experience. I have also reviewed and considered the ‘729 patent (Exhibit 1001), its prosecution history (Exhibit 1002), and the following additional materials:

EXHIBIT	DESCRIPTION
EX1001	U.S. Patent No. 7,841,729
EX1002	Prosecution History for U.S. Patent Application No. 12/011,090
EX1003	Plaintiff’s Claim Terms for Construction (No. 1:24-cv-5218)

EXHIBIT	DESCRIPTION
EX1004	Defendants' Opening Claim Construction Brief (No. 1:24-cv-05218)
EX1005	U.S. Patent Application Publication No. 2007/0046626 to Cheng ("Cheng")
EX1006	U.S. Patent No. 2,682,603 ("Dine")
EX1007	U.S. Patent Application Publication No. 2006/0007666 to Cook ("Cook")
EX1008	U.S. Patent No. 6,799,861 ("Naghi")
EX1009	Japanese Patent Publication No. 1999-066930 to Masayuki ("Masayuki")
EX1010	Certified English Translation of Masayuki
EX1011	RESERVED
EX1012	Chinese Utility Model Patent No. CN 2235130 Y to Luo ("Luo")
EX1013	Certified English Translation of Luo
EX1014	U.S. Patent Application Publication No. 2007/0115672 to Nelson ("Nelson")
EX1015	U.S. Patent Application Publication No. 2007/0139515 to Du Breuil ("Du Breuil")
EX1016	RESERVED
EX1017	Declaration of Morgan Pattison, Ph.D.
EX1018	Ex Parte Reexamination Control No. 90/019,924
EX1019	Return of Service (No. 1:24-cv-05218)

IV. UNDERSTANDING OF THE LAW

20. I am not an attorney but have been instructed in and applied the law as described in this section.

21. Petitioner's counsel has informed me that a patent claim may be "anticipated" if each element of that claim is present either explicitly or inherently

in a single prior art reference, and that the elements should be arranged in the prior art reference as in the claim. Petitioner's counsel has informed me that for a claimed limitation to be inherently present, the prior art need not expressly disclose the limitation, so long as the claimed limitation necessarily flows from a disclosure in the prior art. Additionally, the prior art must contain sufficient guidance so that a POSITA is enabled to make the invention without undue experimentation.

22. Petitioner's counsel has informed me that a patent claim can be considered to have been obvious to a POSITA at the time of the invention (or the earliest effective filing date as a proxy for the time of the invention) of the application. The obviousness inquiry centers on whether the claimed invention as a whole would have been obvious to a POSITA at the time of invention.

23. I understand that claimed subject matter may be obvious if it would have been obvious at the time of the invention to modify a single reference and / or combine multiple references such that all of the limitations of the claim are taught. However, when combining multiple references, I understand that it is not enough to simply show that all the limitations of the claimed subject matter are taught by the prior art. Instead, for claimed subject matter to be obvious over multiple references, there must be some reason or motivation for a POSITA to combine the prior art references to arrive at the claimed subject matter.

24. I have been informed that, in seeking to determine whether an invention that is a combination of known elements would have been obvious to a POSITA at the time of the invention, one must consider the references in their entirety to ascertain whether the disclosures in those references render the combination obvious to such a person.

25. I have been informed and understand that, while not required, the prior art references themselves may provide a teaching, suggestion, motivation, or reason to combine, but other times the motivation linking two or more prior art references is common sense or known to a POSITA at the time of the invention.

26. I understand that a particular combination may considered obvious by a showing that it was obvious to try the combination. I have been informed that, if a technique has been used to improve one device, and a POSITA would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

27. I further understand that an obviousness analysis recognizes that market demand, with or without scientific literature, often drives innovation, and that a motivation to combine references also may be supplied by the direction of the marketplace. For example, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a POSITA has good reason to pursue the known options within his or her technical

grasp because the result is likely the product not of innovation but of ordinary skill and common sense.

28. I have been informed that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. Thus, where all the elements of a claim are used in substantially the same manner, in devices in the same field of endeavor, the claim is likely obvious.

29. Additionally, I understand that a patent is likely to be invalid for obviousness if a POSITA can implement a predictable variation or if there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims. Therefore, when a technology is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one.

30. I also understand that a POSITA having a reasonable expectation of success when combining references for claimed subject matter supports the obviousness of the combination.

31. I have been informed and I understand that factors referred to as "secondary considerations", also referred to as "objective indicia of non-obviousness", may also be considered when assessing obviousness, when such evidence is available. I understand that these secondary considerations can include:

(1) commercial success; (2) long-felt but unresolved needs; (3) copying of the invention by others in the field; (4) initial expressions of disbelief by experts in the field; (5) failure of others to solve the problem the claimed subject matter solved; and (6) unexpected results.

32. I also understand that evidence of these secondary considerations should be commensurate in scope with the claimed subject matter. I further understand that there must be a relationship, sometimes referred to as a "nexus," between any such secondary considerations and the invention.

33. Finally, I have been informed that one cannot use hindsight to determine that an invention was obvious.

34. I provide my opinions in this declaration based on the guidelines set forth above.

V. LEVEL OF A PERSON OF ORDINARY SKILL IN THE ART

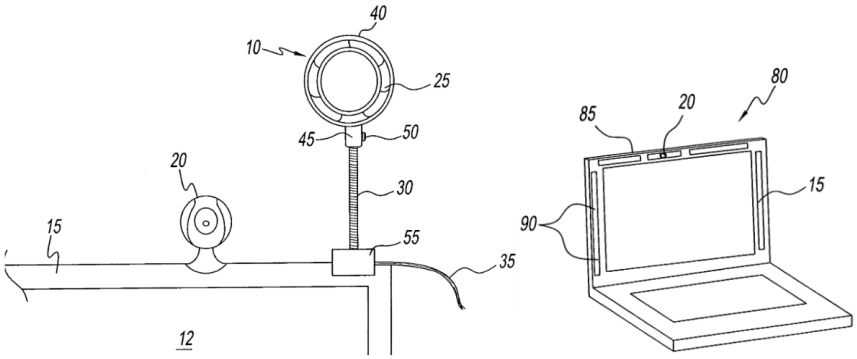
35. In my opinion, a POSITA as of January 26, 2007 would have held at least a bachelor's degree in electrical engineering or a related field (such as mechanical, optical, or illumination engineering) and at least two years of experience with lighting technology. Alternatively, in the absence of an academic degree, six years of hands-on industry experience would provide an equivalent level of skill. A POSITA would understand that all types of cameras (*e.g.*, analog and digital, photo

and video) generally involve the same lighting considerations and that it is important to provide light that evenly illuminates the target subject or object to minimize reflected glare and shadows.

36. In view of my educational background (*e.g.*, Ph.D. in Materials Science, Electronic and Photonic Materials) and years of experience working with lighting technologies, I was a person of more than the ordinary level of skill in the art as of 2007. In forming my opinion, I have drawn on my academic background and professional experiences. My opinions herein, however, were formed considering the perspective of an ordinarily skilled artisan.

VI. TECHNOLOGY BACKGROUND

37. The '729 patent, concerns illuminators used for imaging devices, claims priority to a provisional application dated January 26, 2007. The '729 patent purports to improve image quality with features like a toroidal bulb with a conforming circular reflector (claim 1) or frame-integrated lights where one bulb surrounds the webcam (claim 10).



38. Web cameras ("webcams") are cameras designed to capture static or moving images to be uploaded to or shared in real-time with a computer or computer network. Their image capture functionality is no different than a digital camera or digital video camera. Webcams have been available since the early 1990's. Early webcam usage on the internet was limited to stationary images uploaded to websites. In the late 1990's and early 2000's there were multiple videoconferencing platforms making use of webcams. By the early 2000's webcams were being integrated into some desktop and laptop screens.

39. With any image capture, film camera or digital camera, lighting has always been a critical element. It is important to provide light that evenly illuminates the target object to minimize reflected glare from, and shadows on the photographed objects. This can be achieved by engineering the optical distribution of the light source. The size of the light source, directionality of emitted light, and the diffusion of the light source can be engineered to evenly distribute light across a scene to be photographed. The intensity and optical distribution of a light source can be

quantified with standard measurement techniques. The intensity at a spot can be measured with a light meter. The optical distribution is the intensity spread at different angles from the light and is a standard characterization of light sources.

40. In addition, the color quality of the light source, characterized by both correlated color temperature ("CCT") and color rendering index, is an important aspect of light for photography. Colors must exist in the light source, so they reflect off an object and provide natural coloring of the object. For example, some LED lights may include a low amount of red color making some skin tones look pale. The range of colors within a light source is characterized by the color rendering index (CRI) which compares a source to natural daylight or to an incandescent lamp. Correlated Color Temperature (CCT) is a characterization of the hue of white related to a black body emitter but does not provide information as to the range of colors in the light source.

41. The geometrical orientation between the light-camera-object is not significantly different for any type of camera capturing an image. The light source would typically be outside of the image capture frame and emitting light in generally the same orientation as the orientation of the camera, video camera, or webcam. A larger set of objects to be photographed would benefit from a larger spot of light.

42. While all types of cameras would have similar lighting considerations, webcams are a type of digital camera where images can be captured in a digital

format and uploaded onto a computer or a network of computers. The first widely available digital cameras became available in the late 1980's and 1990's. These cameras could capture an image and upload the image to a computer or network of computers using a memory card or cable. In the late 1990's camera phones with digital cameras integrated into cell phones became available. These phones could send images by email wirelessly or by a cable connection to a computer.

43. All different light source technologies can be used for photography. For example, incandescent lamps can provide a full light spectrum but need reflectors or diffusors to spread the light out and direct it toward the target. LED fixtures can be used with numerous individual LED devices integrated behind a diffusor and on a reflector to direct light towards a target. LED sources can be selected for a range of CCT and CRI values. Fluorescent or compact fluorescent lamps can also be used for photographic applications. There are a range of fluorescent lamp bulb types, including circular or toroidal shaped lamps such as the circline lamp type or compact fluorescent lamp (CFL) "twister" lamps. These lighting types were all available prior to 2007 as shown in the figure below from the June 2006 Department of Energy report "Compact Fluorescent Lighting in America: Lessons Learned on the Way to the Market".

Figure 1.1. Evolution of Compact Fluorescent Lamp Designs. CFLs have come in a variety of shapes and sizes, but the overall trend has been downsizing from the early 2-feet-long U-tubes of the 1970s (which were basically a 4-ft long, 1.5-inch-diameter T-12 bent in half) to the T6 0.5-in.-diameter U-tube (6-in. lamp length plus ballast) of the mid 1980s, to the triple tube or triple biax lamps (4.9 in. lamp, 6 in. with ballast) and double U tube (3-in. lamp length plus ballast) designs of the mid 1990s, to the 4.0-in. twister lamps that first appeared in 1995.

44. In general, the illumination provided for photography is not substantially different from other general illumination applications. In any general illumination application, light needs to be uniformly delivered to the target to enable visibility by human vision (rather than a camera) with minimal glare and shadows and with good color fidelity. Inspection lighting also benefits from larger area sources and diffuse delivery of light so that there are minimal glare spots at the object being inspected and minimal shadows on the target object. The image below shows

an inspection desk light fixture from approximately the 1950's with a fluorescent circline or toroidal lamp within a reflective holder with an articulating arm and a clamp to mount to a desktop.

VII. THE '729 PATENT

A. Effective Filing Date

45. I understand that the application leading to the '729 patent was filed on January 24, 2008 and claims priority to an application filed on January 26, 2007. I understand that in this proceeding which relies on pre-AIA patent law, the effective filing date is the date that the claimed invention was made. However, it is my understanding that it is standard U.S. Patent and Trademark Office (USPTO) practice that the effective filing date is used as a proxy for the date that the claimed invention was made.

46. For purposes of this declaration, I have been instructed to use January 26, 2007 as the effective filing date of the '729 patent (as proxy for the date the invention was made). Therefore, my opinions in this declaration were formed from the perspective of a POSITA as of January 26, 2007, including both the knowledge of a POSITA at that time as well as how a POSITA would have understood the prior art at that time. My opinions, however, would be the same even if the patent is only entitled to a January 2008 filing date.

B. Overview

47. The '729 patent is titled "Webcam Illuminator Device" and describes "An illuminator device for illuminating one or more users in front web camera and a communication terminal having a bulb for emitting light" (EX1001, Abstract).

48. The patent explains how "Video conference calls are a common method for people to communicate" (EX1001, 1:15-16). "Poor lighting is one of the primary reasons for the poor appearance of facial images that are viewed online from webcams" (EX1001, 1:29-31).

49. The patent describes its disclosure for "an illuminator device for the face of the user viewed through a webcam, wherein the illuminator provides diffuse illumination to the face of the user" (EX1001, 1:40-43).

50. The stated motivations within the patent are to improve the appearance of individuals' faces captured by the webcam using diffuse light. "The diffuse light

is the most flattering…because it prevents any shadows from being cast on the user's face. Diffuse light also prevents any facial imperfections from being highlighted on the face of the user" (EX1001, 3:1-4).

51. In one embodiment, "Illuminator 10 of the present invention is a connected frame 15 of screen 12 of a computer proximate a webcam 20" (EX1001, 2:41-43). The illuminator "has a reflector 40 that surrounds or encases bulb 25" which has "a toroidal or ring configuration" This configuration "is capable of diffusing and shaping light through its surface" (EX1001, 2:55-58).

52. The patent shows configurations with the illuminator located adjacent to the webcam, both attached to a computer screen (EX1001, figures 1-3), images with the illuminator integrated into a laptop computer screen (EX1001, figures 4 and 5), an image with the illuminator on a desktop adjacent to a laptop computer with the webcam attached to the screen (EX1001, figure 6), and the illuminator on a desktop located adjacent to an independent monitor with a webcam attached (EX1001, figure 7).

C. Claims

53. For reference, claims patent are reproduced below:

> **1.** An illuminator device for illuminating one or more users in front of a web camera and a communication terminal comprising: a bulb having a toroidal shape for emitting light; a reflector having a circular configuration to conform to the toroidal shape of said bulb for projecting

the emitted light; and an arm disposed between said bulb and the terminal for connection to the terminal, wherein said bulb is positionable relative to the web camera to provide optimal viewing of the user through the web camera.

2. The illuminator device of claim 1, wherein said reflector is positioned proximate said bulb to project light towards a face of said user or said users.

3. The illuminator device of claim 1, wherein said reflector is lined with a reflective material or film.

4. The illuminator device of claim 1, wherein said arm is a flexible arm that permits said bulb to be positioned relative to the web camera.

5. The illuminator device of claim 1, wherein said arm is connected to the terminal by a clamp.

6. The illuminator device of claim 5, wherein the clamp is movable along an edge of the terminal to adjust the location of said bulb.

7. The illuminator device of claim 1, wherein the arm has a base that supports the illuminator device on a flat surface adjacent to the terminal.

8. The illuminator device of claim 1, wherein said reflector has a piece of fabric thereon disposed between said bulb and a user's face for diffusing the light emitted from said bulb.

9. The illuminator device of claim 8, wherein said fabric is silk or muslin.

10. An illuminator device for illuminating one or more users in front of a web camera and a communications terminal having a frame and a screen comprising: a plurality of bulbs, wherein said plurality of bulbs are disposed in the frame of the terminal and one of said plurality of bulbs surrounds the web

11. The illuminator device of claim 10, wherein one of said plurality of bulbs is on one side of the web camera

and another of said plurality of bulbs is on the other side of the web camera.

12. The illuminator device of claim 10, wherein in each of said plurality of bulbs are rectangularly shaped.

13. The illuminator device of claim 10, wherein said plurality of bulbs are a plurality of electrodes spaced in the frame of the screen.

VIII. GROUNDS FOR INVALIDITY

54. Claims 1-13 of the '729 Patent are invalid as obvious under pre/post-AIA 35 U.S.C. § 103 in view of at least the prior art listed herein and set forth in the accompanying Exhibits.

55. Specifically, claims 1-13 of the '729 patent are obvious based on the grounds listed below:

Ground	Claim(s)	Pre-AIA 35 U.S.C. §	Reference(s)
Ground 1A	1-6	103	Naghi, Dine
Ground 1B	7	103	Naghi, Dine, Cheng
Ground 1C	8, 9	103	Naghi, Dine, Cook
Ground 2A	1-7	103	Nelson, Luo
Ground 2B	8, 9	103	Nelson, Luo, Cook
Ground 3A	1-4, 7	103	Cheng, Masayuki
Ground 3B	5, 6	103	Cheng, Masayuki, Nelson
Ground 3C	8, 9	103	Cheng, Masayuki, Cook
Ground 4A	10-13	103	Du Breuil, Dine

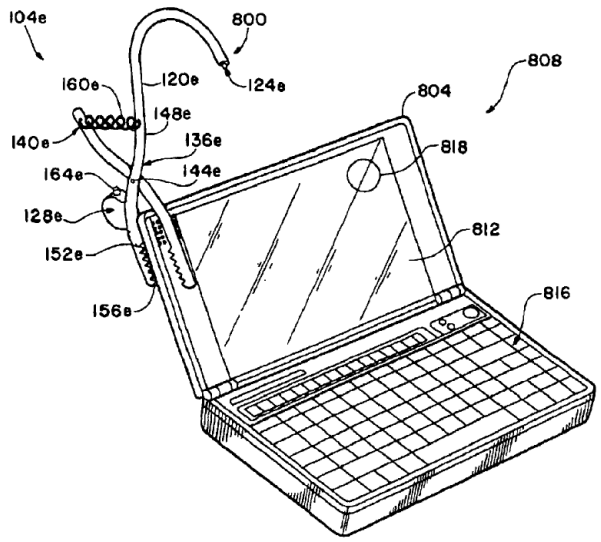
IX. DETAILED EXPLANATION OF GROUNDS

A. Ground 1A: Naghi and Dine Render Claims 1-6 Obvious Under 35 U.S.C. § 103.

1. Claim 1

Preamble [1pre]: "<u>An illuminator device for illuminating one or more users in front of a web camera and a communication terminal comprising:</u>"

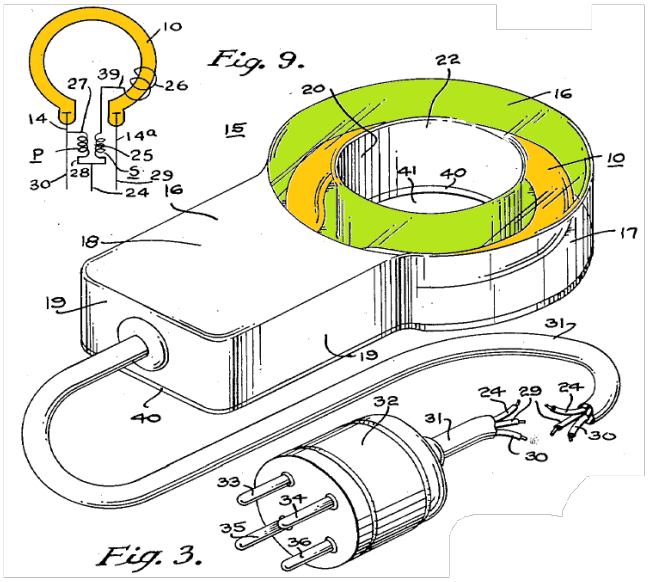
56. Naghi describes an illuminator device (*e.g.*, laptop light 800) for illuminating one or more users in front of a web camera (camera 818) and a communication terminal (laptop computer 808). EX1008 at 7:24-25. This is depicted in FIG. 11 of Naghi below:

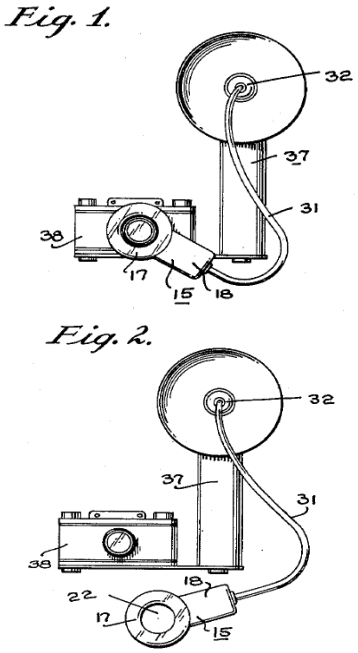


Elements [1a] and [1b]: "<u>a bulb having a toroidal shape for emitting light</u>" and "<u>a reflector having a circular configuration to conform to the toroidal shape of said bulb for projecting the emitted light</u>"

57. Dine discloses a portable photographic light unit that contains both claim 1 elements [1a] and [1b]. First, it discloses a bulb in the shape of a toroid (circular tube 10). EX1006 at 2:8-9, 3:1-2. The toroidal shape of Dine's tube 10 is

depicted in Dine's drawings, including the perspective and side views shown in Figure 3 below.





58. Second, Dine's portable light unit includes a circular reflector that conforms to the toroidal shape of the bulb. Specifically, Dine teaches that the tube 10 is housed within an annular (circular) chamber of a housing 17. EX1006 at 2:28-34. Dine further teaches that all surfaces of the housing, except the front-facing circular portion overlying the tube 10, are rendered opaque using a reflective coating 42, so that light emitted from the tube 10 is projected axially forward towards the photographic subject. EX1006 at 3:49-57.

59. Therefore, it is my opinion that Dine's housing thereby functions as a reflector for projecting forward light that would otherwise radiate backwards. It is also my opinion that a POSITA would have been motivated to modify Naghi's

portable lighting apparatus by incorporating Dine's Toroidal bulb shape and conforming reflector.

60. It is also my opinion that a POSITA would have been motivated to modify Naghi's portable lighting apparatus by incorporating Dine's Toroidal bulb shape and conforming reflector for several reasons. First, Naghi explicitly teaches the use of its portable lighting apparatus in conjunction with a laptop computer equipped with a video camera (*i.e.*, a webcam). A POSITA would have appreciated that, to optimize the laptop user's on-camera appearance, Naghi's lighting apparatus should be capable of illuminating their face with ample, uniform light, without casting unflattering shadows (as disclosed by Dine).

61. Second, a well-known objective of illuminating objects for imaging is described by Dine as, "the subject to be photographed may be uniformly illuminated virtually free of any shadow." EX1006 at 1:16-18. Capturing an image of a subject whether for photography or webcam faces similar challenges. A shape or toroidal shape light source or bulb provides for light being emitted from a larger area which thereby provides the opportunity for brighter, more uniform illumination of the object and for light to reach the object to be imaged at different angles and reflect from the object to the imaging device, whether it be a film camera, digital camera, video camera, web camera, or other imaging device.

62. As described above, at VI, at the time of filing the '729 patent, the technical problem of insufficient, uneven lighting and its adverse effects on image quality was well-known in the fields of photography and videography.

63. Substituting Naghi's light source (124e) with Dine's toroidal shaped bulb would have been an obvious substitution of one known illumination means for another, with the expectation of achieving the very uniform lighting effect that Dine taught using a continuous circular tube – *i.e.*, a toroidal light source. Thus, Dine contributes the toroidal bulb element, and the motivation to use it is that it explicitly solves the known lighting problem identified in the '729 patent, as well as in the broader field of imaging technology.

64. Beyond the teachings of the references alone, market and design incentives would have driven the combination. It would be a matter of common sense to use illumination technology from other mature imaging applications, such as film photography, digital photography, and videography and apply the technology to webcam imaging. As described above, webcam users and designers were also motivated by the need for even, flattering lighting (for better on-camera appearance). Ring lights were well-known in the art to achieve uniform illumination on a subject's face. It would have been natural for an ordinary artisan to consider applying that known form factor to a webcam context to satisfy consumer demand for improved image quality. Combining Naghi and Dine not only would have been motivated–it

would have been straightforward and predictable to implement, yielding no unexpected obstacles. A POSITA would have had a high expectation of success in using Dine's toroidal bulb as part of this combination.

65. Dine explicitly teaches such a circular conformal reflector. It is my opinion that there is nothing challenging about integrating Dine's circular reflector teaching into Naghi's lighting system. This would fall well within the routine skill of a POSITA. This is a predictable improvement based on the established function of Dine's circular reflector (to conform to a toroidal lamp and reflect light, thereby providing a stronger overall lighting effect). Having decided to use Dine's toroidal bulb teaching to modify Naghi's light source, it would also be a simple and logical step for a POSITA to also adopt Dine's conforming reflector to ensure optimal performance of that toroidal bulb, as the components are designed to function together to achieve uniform forward light projection.

66. POSITA experience with any form of light fixtures and sources would further motivate the use of a conformal reflector. Conformal reflectors will redirect the maximum of light toward the object to be illuminated, evenly distribute the light, and reduce the size and weight of the light fixture.

Element [1c]: "<u>and an arm disposed between said bulb and the terminal for connection to the terminal, wherein said bulb is positionable relative to the web camera to provide optimal viewing of the user through the web camera.</u>"

67. Naghi's portable lighting apparatus includes such an arm (bendable body portion 120/120a-e) disposed between the bulb (light source 124/124a-e) and a communications terminal (laptop computer 808) for connection to the terminal. Naghi further teaches that the bulb is positionable relative to the web camera (camera 818) associated with the communications terminal to provide optimal viewing of the user through the web camera. In that regard, Naghi states that "[t]he light source 124/124a-e is oriented to a desired position by bending the adjustable, bendable body 120 to a desired configuration." EX1008 at 4:18-20.

2. Claim 2: "<u>The illuminator device of claim 1, wherein said reflector is positioned proximate said bulb to project light towards a face of said user or said users</u>."

68. Dine teaches this additional limitation. Dine's toroidal bulb is encased within the annular chamber 21 of the housing 17. EX1006 at 2:30-35. Further, because all surfaces of the housing 17 except the front portion overlaying the bulb are painted with a reflecting coating, the light emitted by the bulb is projected forward towards the photographic subject. EX1006 at 3:49-61. (*e.g.*, portion of housing 17 coated with a reflective coating 42) is positioned proximate said bulb (gaseous discharge tube 10) to project light towards a face of said user or said users.

69. Thus, the housing of Dine's lighting module acts as a reflector and is positioned "proximate" the bulb to redirect light towards the photographic subject.

Additionally, claim 2 is generally obvious since the intent of a reflector within a fixture is to optically control and redirect light toward the intended object to be illuminated.

3. Claim 3: "<u>The illuminator device of claim 1, wherein said reflector is lined with a reflective material or film</u>."

70. Dine teaches this additional limitation. Dine teaches that its reflector (*e.g.*, portion of circular part 17) is lined with a reflective material or film (reflective coating 42). The coating serves to act as a reflective material or film.

4. Claim 4: "<u>The illuminator device of claim 1, wherein said arm is a flexible arm that permits said bulb to be positioned relative to the web camera</u>."

71. Naghi teaches this limitation. Specifically, Naghi teaches that the arm (body portion 120/120a-e) of its portable lighting apparatus is "adjustable" and "bendable." EX1008 at 2:61-62.

5. Claim 5: "<u>The illuminator device of claim 1, wherein said arm is connected to the terminal by a clamp</u>."

72. Naghi teaches that the arm (body portion 120/120a-e) of its portable lighting apparatus can be connected to a laptop computer using a clamping mechanism comprising lower arm portions 152 and engagement teeth 156. EX1008 at 4:1-2, 4:10-12

6. Claim 6: "<u>The illuminator device of claim 5, wherein the clamp is movable along an edge of the terminal to adjust the location of said bulb</u>."

73. Naghi's clamping mechanism can be released to move the portable lighting apparatus to another location on the frame of a laptop computer. EX1008 at 7:18-22, 4:8-15.

B. Ground 1B: Naghi, Dine, and Cheng Render Claim 7 Obvious Under 35 U.S.C. § 103.

7. Claim 7: "<u>The illuminator device of claim 1, wherein the arm has a base that supports the illuminator device on a flat surface adjacent to the terminal.</u>"

74. As discussed above, the combination of Naghi and Dine teaches all the elements of claim 1. Further, Cheng teaches the additional limitation of claim 7. Specifically, Cheng teaches that its arm (arm 12) has a base (base 11) that supports the illuminator device on a flat surface adjacent to a communications terminal (image output device 16). EX1005 at Abstract.

75. A POSITA would have recognized that, instead of having a clamping mechanism at one end, the bendable body portion 120/120a-e of Naghi's portable lighting apparatus could be modified to include a base like Cheng's base.

76. I believe that a POSITA would have appreciated that such a modification of Naghi's apparatus would have benefits, including enabling the apparatus to be stably mounted on a flat surface.

77. It is my opinion that this modification would have been obvious to a POSITA as it would have involved the mere substitution of one element (Naghi's clamp) with another known element (Cheng's base) to produce a predictable result (stable mounting on a flat surface).

C. Ground 1C: Naghi, Dine, and Cook Render Claims 8 and 9 Obvious Under 35 U.S.C. § 103.

1. Claim 8: "<u>The illuminator device of claim 1, wherein said reflector has a piece of fabric thereon disposed between said bulb and a user's face for diffusing the light emitted from said bulb.</u>"

78. Naghi and Dine teach all the limitations of claim 1, as discussed above.

79. Cook teaches such a piece of fabric (panel 71 formed of netting 73) thereon disposed between a bulb (light source 49) and a user's face for diffusing the light emitted from said bulb.

80. Specifically, Cook teaches a light modifier for creating an enhanced depth of lighting on a subject. EX1007, at Abstract. The light modifier includes a housing 13 with a first end 29 adapted to receive a light source and a second end 31 comprising a removably attached panel 71. EX1007, ¶ [0015]. The panel is made from netting fabric 73. *Id*. Cook explicitly teaches that the netting acts to diffuse the light emitted by the light source. *Id*. ("The layer of netting 73 acts to diffuse or modify the light that it receives from the light source 49.")

81. I believe that a POSITA would have recognized the benefits of adding a fabric to this combination to aid in diffusing light and produce even more uniform and shadow-free illumination. The use of fabrics in photography, filming, and image capture has been known in the art much prior to the filing date of the '729 patent.

82. A POSITA would be motivated to apply Cook's teachings regarding fabric to the Naghi-Dine combination, as this merely involves the predictable addition of a fabric diffusor a known lighting technology exemplified by Cook to the Cheng-Dine combination based on its established function (the inherent diffuse reflection property of fabric, like a lamp-shade). Therefore, it is obvious.

2. Claim 9: "<u>The illuminator device of claim 8, wherein said fabric is silk or muslin.</u>"

83. Cook explicitly teaches that "[e]xamples of netting that are particularly useful are cotton, nylon, polyester or similar fabric netting having the ability to withstand high heat applications." EX1007, ¶ [0015]. This additional limitation is within the routine technical capabilities of a POSITA, particularly given that Cook itself has already disclosed various similar fabric materials. EX1006, ¶ [0015]. Additionally, according to the Oxford English Dictionary (OED) Muslin is a type of cotton.[1] And cotton is explicitly taught by Cook. EX1006, ¶ [0015].

[1] https://www.oed.com/dictionary/muslin_n?tl=true.

84. Alternatively, it would nonetheless be obvious to a POSITA that any fabric that is transparent and provides diffusing light properties could be used. This could include silks, cottons, or suitable derivatives. It is not beyond the ordinary skill of a POSITA to select a fabric from different possible fabrics. And it would have been obvious to a POSITA to try using muslin or silk as a diffusion fabric disposed between the light source and the subject's face.

D. Ground 2A: Nelson and Luo Render Claims 1-7 Obvious Under 35 U.S.C. § 103.

1. Claim 1

Preamble [1pre]: "<u>An illuminator device for illuminating one or more users in front of a web camera and a communication terminal comprising</u>"

85. Nelson teaches a portable illuminating device "capable of attaching, grasping or securing itself to a number of structures," including a "laptop or notebook computer." EX1014, ¶¶ [0032], [0037].

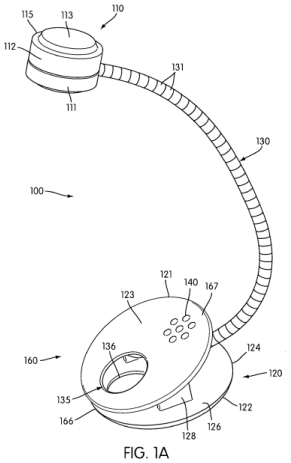


FIG. 1A

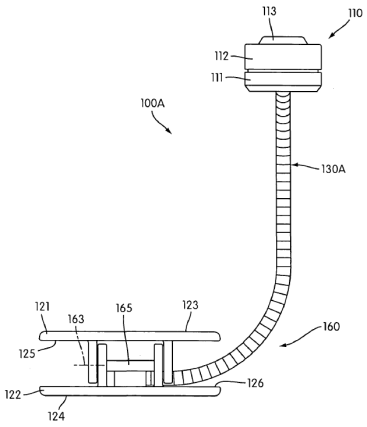
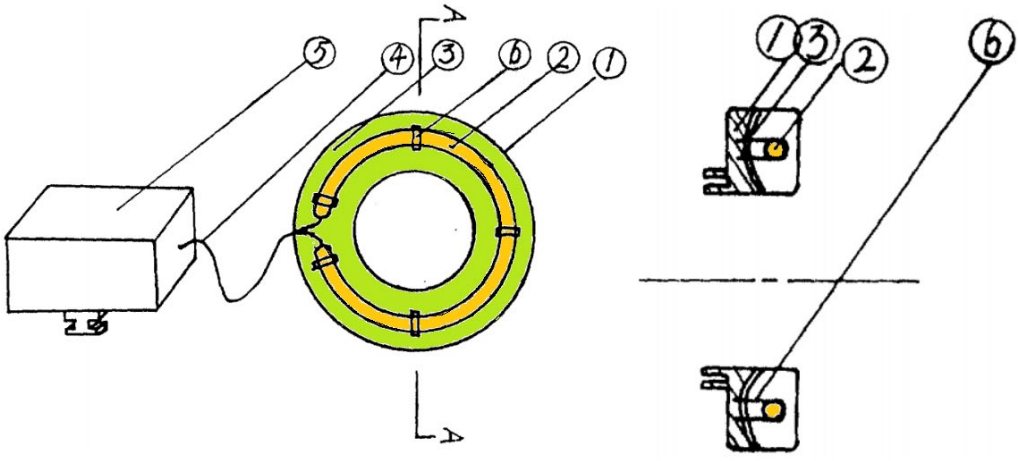


FIG. 3A

86. As described above, at VI, webcams were well known in the art prior to the filing date of the '729 patent and therefore to the extent that Nelson contemplates using its portable illuminating device in conjunction with "laptop or notebook computer[s]," this would include the use of the illuminating device to illuminate one or more users in front of a web camera.

Elements [1a] and 1[b]: "a bulb having a toroidal shape for emitting light" and "a reflector having a circular configuration to conform to the toroidal shape of said bulb for projecting the emitted light"

87. Luo's portable flash device comprises a toroidal lamp tube 2, which is surrounded by a circular reflector 3. *See* EX1013 at 5 ("Referring to Figures 1 and 2 . . . [c]lips (6) are used to secure a toroidal lamp tube (2) and a circular reflector (3) inside the ring flash housing (1), thereby forming an integrated structure."). Luo's portable flash device has the axis of the flash aligning with the axis of the camera lens to eliminate shadows on the film.



88. A POSITA would have been motivated to improve Nelson's portable illuminating device by incorporating Luo's integrated toroidal lamp tube and conforming circular reflector system. This motivation would extend to using Luo's higher improved light diffusion to achieve shadowless illumination for Naghi's laptop context to illuminate a user's face when using a webcam with superior lighting.

89. This localized change to a lighting element would predictably enhance the overall lighting performance of Nelson's system according to the understanding of a POSITA that light produced by a light source of appreciable angular size enables the shadows and contrasts that help to illuminate a person as normally seen. This localized change would merely be a simple substitution of one element for another by a POSITA to produce an expected improvement in the lighting and illumination of a subject.

Element [1c]: "<u>and an arm disposed between said bulb and the terminal for connection to the terminal, wherein said bulb is positionable relative to the web camera to provide optimal viewing of the user through the web camera.</u>"

90. I concur with the Petition's analysis at V(D)(1) that Nelson's portable illuminating device 100 includes such an arm (flexible neck 130) disposed between the bulb encased within the housing 115 and a communications terminal (*e.g.*, laptop computer) for connection to the terminal.

91. A POSITA would have understood that the bulb in Nelson's illuminating device would be positionable relative to a web camera associated with the communications terminal to provide optimal viewing of the user through the web camera, especially because of the "neck 130" that "enables the head 110 to be adjustably positioned relative to the body 160." EX1014, ¶ [0030].

2. Claim 2: "<u>The illuminator device of claim 1, wherein said reflector is positioned proximate said bulb to project light towards a face of said user or said users.</u>"

92. The reflector of Luo is positioned proximate to said bulb to project light towards the face of said user or said users. Luo's toroidal lamp tube 2 is surrounded by a circular reflector 3. EX1013, at 2.

93. A POSITA would have been motivated to incorporate the toroidal shape of Luo's lamp tube and its conforming circular reflector into Nelson's illuminator device so that the reflector projects the light towards a user's face. Nelson discloses use of its illuminator device in conjunction with a laptop computer (known in the art to include a webcam). EX1014, ¶¶ [0032], [0037].

3. Claim 3: "<u>The illuminator device of claim 1, wherein said reflector is lined with a reflective material or film.</u>"

94. I believe that a POSITA would have recognized that Luo's reflector is necessarily lined with a reflective material or film to achieve its reflective properties.

4. Claim 4: "<u>The illuminator device of claim 1, wherein said arm is a flexible arm that permits said bulb to be positioned relative to the web camera.</u>"

95. It is my opinion that Nelson teaches that the arm (neck 130) of its portable illuminator device is "flexible." EX1014, ¶ [0030]. Nelson further teaches that the "neck 130 enables the head 110 to be adjustably positioned relative to the body 160. In an illustrative arrangement, the neck 130 is a universally adjustable elongated flexible connecting structure." EX1014, ¶ [0030]. It would have been obvious to a POSITA who would have understood that the light source in Nelson's illuminator device would be positionable relative to a web camera when attached to a webcam-equipped laptop computer.

5. Claim 5: "<u>The illuminator device of claim 1, wherein said arm is connected to the terminal by a clamp.</u>"

96. It is my opinion that Nelson teaches that the arm (neck 130) of its portable illuminator device can be connected to a laptop computer using a clamp 120. EX1014, ¶ ¶[0032], [0037].

6. Claim 6: "<u>The illuminator device of claim 5, wherein the clamp is movable along an edge of the terminal to adjust the location of said bulb.</u>"

97. It is my opinion that Nelson's clamp 120 can be released to move the portable illuminator device to another location on the frame of a laptop computer.

See EX1014, ¶ [0032] ("Generally, the clamp 120 has a clamped position and an open position").

7. Claim 7: "<u>The illuminator device of claim 1, wherein the arm has a base that supports the illuminator device on a flat surface adjacent to the terminal.</u>"

98. It is my opinion that Nelson teaches that its arm (neck 130) can have a body/base 160 that supports the illuminator device 100 on a flat surface, as shown in Figures 1A and 3A of Nelson.

E. Ground 2B: Nelson, Luo, and Cook Render Claims 8 and 9 Obvious Under 35 U.S.C. § 103.

1. Claim 8: "<u>The illuminator device of claim 1, wherein said reflector has a piece of fabric thereon disposed between said bulb and a user's face for diffusing the light emitted from said bulb.</u>"

99. It is my opinion that the combination of Nelson and Luo teaches all the limitations of independent claim 1.

100. I also agree that Cook teaches the additional limitation of claim 8. Specifically, Cook teaches a light modifier for creating an enhanced depth of lighting on a subject. EX1007 at Abstract. The light modifier includes a housing 13 with a first end 29 adapted to receive a light source and a second end 31 comprising a removably attached panel 71. EX1007, ¶ [0015]. The panel is made from netting fabric 73. EX1007, *Id*. Cook explicitly teaches that the netting acts to diffuse the

light emitted by the light source. EX1007, *Id*. ("The layer of netting 73 acts to diffuse or modify the light that it receives from the light source 49.").

101. I believe that a POSITA would have recognized the benefits of adding a fabric to this combination to aid in diffusing light and produce even more uniform and shadow-free illumination. The use of fabrics in photography, filming, and image capture has been known in the art much prior to the filing date of the '729 patent.

102. A POSITA would be motivated to apply Cook's teachings regarding fabric to the Naghi-Dine combination, as this merely involves the predictable addition of a fabric diffusor, a known lighting technology exemplified by Cook to the Cheng-Dine combination based on its established function (the inherent diffuse reflection property of fabric, like a lamp-shade). Therefore, it is obvious.

2. Claim 9: "<u>The illuminator device of claim 8, wherein said fabric is silk or muslin.</u>"

103. It is my opinion that Cook explicitly teaches that "[e]xamples of netting that are particularly useful are cotton, nylon, polyester or similar fabric netting having the ability to withstand high heat applications." EX1007, ¶ [0015].

104. It would have been obvious to a POSITA to try using muslin as a diffusion fabric disposed between the light source and the subject's face.

105. This additional limitation is also within the routine technical capabilities of a POSITA, particularly given that Cook itself has already disclosed

various similar fabric materials. EX1006, ¶ [0015]. Additionally, according to the Oxford English Dictionary (OED) Muslin is a type of cotton.[2] And cotton is explicitly taught by Cook. EX1006, ¶ [0015]. The OED also lists references to Muslin being a type of silk.[3]

106. Alternatively, it would nonetheless be obvious to a POSITA that any fabric that is transparent and provides diffusing light properties could be used. This could include silks, cottons, or suitable derivatives. It is not beyond the ordinary skill of a POSITA to select a fabric from different possible fabrics. And it would have been obvious to a POSITA to try using muslin or silk as a diffusion fabric disposed between the light source and the subject's face.

F. Ground 3A: Cheng and Masayuki Render Claims 1-4 and 7 Obvious Under 35 U.S.C. § 103.

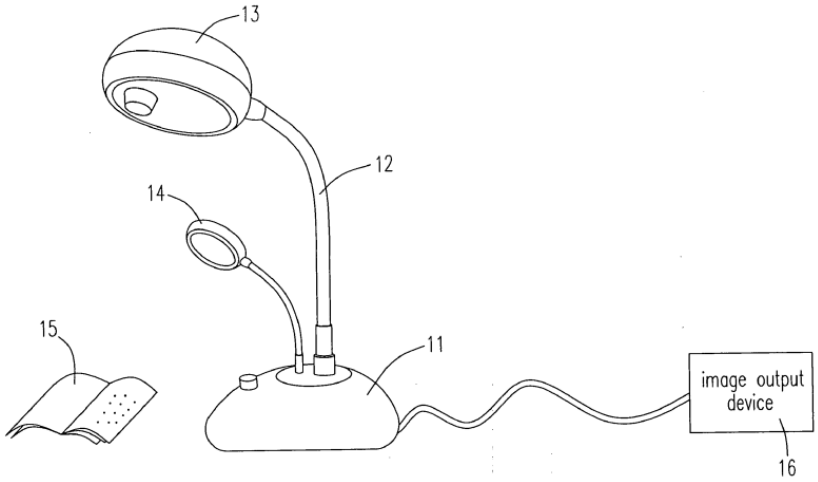
1. Claim 1

Preamble [1pre]: "<u>An illuminator device for illuminating one or more users in front of a web camera and a communication terminal comprising</u>"

107. It is my opinion that Cheng teaches a digital presenter with a camera and a lamp. EX1005, ¶ [0007].

[2] https://www.oed.com/dictionary/muslin_n?tl=true.

[3] "All the cloathes of Gold and of Silke called Mossulines are wrought in Moxul." https://www.oed.com/dictionary/muslin_n?tl=true



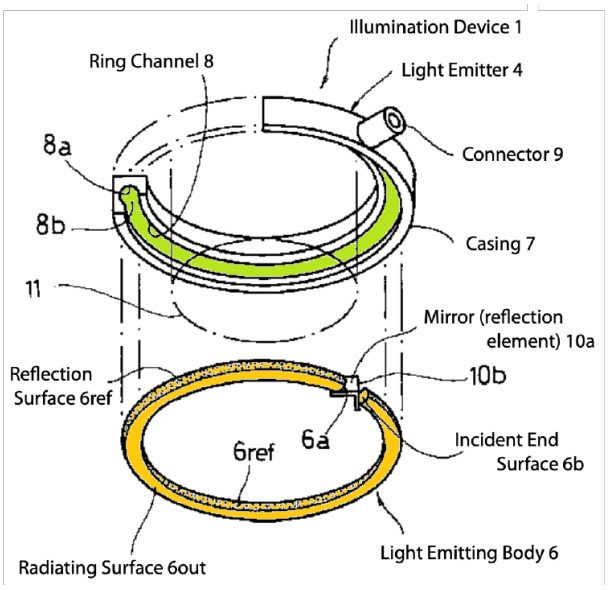
108. I also agree that Cheng teaches that the digital presenter can be used to display the images captured by the camera on an external image output device, including, but not limited to, a multimedia projector, rear projector television, general television, or liquid crystal display (LCD) monitor. EX1005, ¶ [0002].

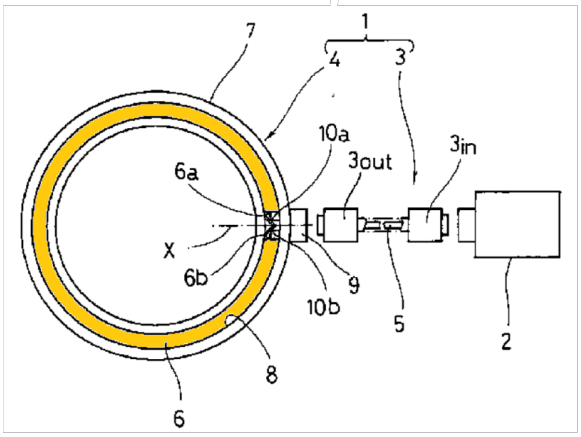
109. Among other things, the digital presenter can be used to conduct a video conference. EX1005, ¶ [0015]. Thus, Cheng teaches an "illuminator device" (digital presenter) that illuminates (via lamp 14) one or more users in front of a "web camera" (camera 13) and a "communication terminal" (image output device 16, *e.g.*, desktop computer). *Id*.

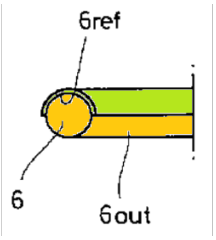
Elements [1a] and 1[b]: "<u>a bulb having a toroidal shape for emitting light</u>" and "<u>a reflector having a circular configuration to conform to the toroidal shape of said bulb for projecting the emitted light</u>"

110. Masayuki describes an illumination device comprising a ring-shaped (toroidal) light emitting body 6, which is housed within a ring channel 8 formed

inside of a casing 7. EX1009 at 1. The light emitting body is surrounded by a conforming circular reflector (reflection surface 6ref) on one side. EX1009 at 1. The light emitted from the light emitting body is redirected from the reflection surface towards the opposite, radiating surface 6out, "thereby undergoing diffusion reflection and being emitted to the exterior." EX1009 at 1.







111. Masayuki teaches that the illumination device that can be installed around the lens of a camera to project uniform light from the periphery of the lens onto the photographic subject. EX1009, ¶ [0002].

112. I believe that a POSITA would have been motivated to incorporate the toroidal shape of Masayuki's light emitting body and its conforming circular reflector into Cheng's digital presenter. Cheng explicitly teaches the use of its digital

presenter as a web camera to conduct a videoconference. EX1005, ¶ [0002]. A POSITA would have appreciated that, to optimize the user's on-camera appearance, Cheng's digital presenter should be capable of illuminating their face with ample, uniform light, and minimizing unflattering shadows. As described above at VI, the technical problem of insufficient, uneven lighting and its adverse effects on image quality was well-known in the field of photography and videography.

113. Therefore, the prior art as well as Masayuki itself explicitly recognized the need to "provid[e] uniform diffusion illumination" of a photographic subject. EX1009, ¶ [0015].

114. I believe that this need to uniformly illuminate a webcam user's face would have prompted and motivated a POSITA to seek a solution. A POSITA would have recognized that Masayuki provides one such solution. As already discussed herein, "Ring" lights were well-known in the art (*e.g.*, in photography, videography, makeup lighting, etc.) to achieve soft, uniform illumination of the subject's face. Masayuki itself teaches that "uniform diffused illumination" of a photographic subject can be achieved using a ring-shaped, toroidal bulb and conforming circular reflector. EX1009, ¶ [0004]; *see also* EX1009, ¶¶ [0006], [0013], [0015]. I believe that a POSITA would have been motivated to incorporate Masayuki's lighting module comprising a toroidal light emitting body and conforming reflector into Cheng's digital presenter.

115. At least driven by the need to address technical problems such as insufficient illumination and eliminating shadows in photography, a POSITA would have been motivated to improve Cheng's digital presenter by incorporating Masayuki's more advanced and integrated and larger angular sized lighting system, with its integrated toroidal bulb and conforming circular reflector, to increase the angular size of the light source. Masayuki's system directly addresses the goal of providing uniform, diffused, ring-shaped illumination, which is superior for many imaging tasks compared to a generic light source.

116. Additionally, I believe that a POSITA would have recognized that Masayuki's teachings could be readily applied in the webcam context, because the same general lighting principles apply to all camera types (*e.g.*, analog and digital, photo and video). Adopting Masayuki's specialized optical design, would have improved illumination of the webcam user.

117. I believe that substituting Masayuki's lighting module in place of Cheng's existing lamp would have amounted to a simple "substitution of one element for another known in the field" which would have produced a predictable result that includes uniform, shadow-free illumination of the webcam user's face.

Element [1c]: "<u>and an arm disposed between said bulb and the terminal for connection to the terminal, wherein said bulb is positionable relative to the web camera to provide optimal viewing of the user through the web camera.</u>"

118. I believe that Cheng's digital presenter includes such an arm disposed between the lamp 14 and a communications terminal (image output device 16, *e.g.*, desktop computer). EX1005, ¶ [0002]. I believe that Cheng clearly depicts in the figures that the lamp 14 is "positionable relative to the web camera [13]" because the arm of the lamp 14 is depicted in a bent position, EX1005, FIG. 1. I believe that this clearly indicates that it is bendable.

119. To the extent the arm of the lamp 14 is inflexible, the lamp is still "positionable relative to the web camera [13]" because Cheng's specification clearly states that the *arm of the camera* is "flexible." EX1005, ¶ [0015]. Said differently, even if the arm of Cheng's lamp is rigid, the lamp's position relative to the camera can still be changed by adjusting the position of the camera.

120. Additionally, to the extent the arm of Cheng's lamp is not already bendable. I believe that a POSITA would have been motivated to replace it with a bendable arm, like the bendable arm supporting Cheng's camera already present and depicted on the same device. A POSITA would have seen and easily understood the benefit of such a modification, as it would have permitted the position of the lamp relative to the camera to be adjusted by bending the arm of the lamp as well as by bending the arm of the camera (or by doing both). This modification would have amounted to a mere substitution of one element (the rigid support arm) with another known element (a flexible support arm) to yield a predictable result.

2. Claim 2: "The illuminator device of claim 1, wherein said reflector is positioned proximate said bulb to project light towards a face of said user or said users."

121. It is my opinion that Masayuki teaches this additional limitation. Masayuki's toroidal light emitting body 6 is surrounded on one side by a reflection surface 6ref. EX1009 at 1. The purpose of the reflection surface 6ref is to reflect light towards the radiating surface 6out on the opposite side of the light emitting body 6. EX1009, *Id*. Thus, Masayuki's reflection surface 6ref is positioned "proximate" the light emitting body 6 to redirect light towards the photographic subject. More specifically, when incorporated into Cheng's digital presenter, Masayuki's reflector would be projecting the light towards the face of the webcam user.

3. Claim 3: "The illuminator device of claim 1, wherein said reflector is lined with a reflective material or film."

122. It is my opinion that Masayuki teaches that the reflecting surface 6ref comprises a reflective coating. *See* EX1009, ¶ [0010] ("[A]s shown in Fig. 4, a reflective coating is applied to its peripheral surface at the Bottom Section 8a side of Ring Channel 8, thereby forming Reflection Surface 6ref for causing diffusion reflection of the light advancing through Light Emitting Body 6 and directing it toward the Opening Section 8b side of Ring Channel 8.")

4. Claim 4: "<u>The illuminator device of claim 1, wherein said arm is a flexible arm that permits said bulb to be positioned relative to the web camera.</u>"

123. As discussed above in relation to claim 1, the lamp 14 is connected to the base of Cheng's digital presenter via a flexible arm. I believe that even if it was not flexible (even though it appears to be depicted as such) it would have been both simple and obvious to a POSITA to replace it with a flexible arm.

5. Claim 7: "<u>The illuminator device of claim 1, wherein the arm has a base that supports the illuminator device on a flat surface adjacent to the terminal.</u>"

124. It is my opinion that Cheng discloses a base 11 that supports the illuminator device on a flat surface adjacent to a communications terminal (image output device 16). I believe a POSITA would have recognized that the base supports the illuminator device (digital presenter) on a flat surface adjacent to the communications terminal.

G. Ground 3B: Cheng, Masayuki, and Nelson Render Claims 5 and 6 Obvious Under 35 U.S.C. § 103.

1. Claim 5: "<u>The illuminator device of claim 1, wherein said arm is connected to the terminal by a clamp.</u>"

125. As discussed in relation to claim 1, the combination of Cheng and Masayuki teaches all the limitations of independent claim 1. Nelson teaches that an illuminating device comprising a lamp, a flexible neck 130, and a body/base 160

adapted both to clamp onto various objects (*e.g.*, a laptop computer) and to be positioned on a flat, stable surface. EX1014, Figs. 1 & 3A, ¶ [0037].

126. It would have been obvious to a POSITA to enhance the utility of Cheng's digital presenter by replacing its base 11 with a base like Nelson's body/base, so that the digital presenter could be removably attached to a computer, laptop, or another external image output device 16.

127. I believe that a POSITA would have readily recognized that utilizing Nelson's teaching of a base with a clamping functionality to improve Cheng's digital presenter would have merely involved substitution of one element (Cheng's base) with another known element (Nelson's base) to achieve a predictable result (increased positioning flexibility).

2. Claim 6: "<u>The illuminator device of claim 5, wherein the clamp is movable along an edge of the terminal to adjust the location of said bulb.</u>"

128. It is my opinion that Nelson's clamp 120 can be released to move the portable illuminator device to another location on the frame of a laptop computer. EX1014, ¶ [0032] ("Generally, the clamp 120 has a clamped position and an open position").

H. Ground 3C: Cheng, Masayuki, and Cook Render Claims 8 and 9 Obvious Under 35 U.S.C. § 103.

1. Claim 8: "<u>The illuminator device of claim 1, wherein said reflector has a piece of fabric thereon disposed between said</u>

bulb and a user's face for diffusing the light emitted from said bulb."

129. It is my opinion that the combination of Cheng and Masayuki teaches all the limitations of independent claim 1. Further, Cook teaches the additional limitation of claim 8.

130. I also agree that Cook teaches the additional limitation of claim 8. Specifically, Cook teaches a light modifier for creating an enhanced depth of lighting on a subject. EX1007 at Abstract. The light modifier includes a housing 13 with a first end 29 adapted to receive a light source and a second end 31 comprising a removably attached panel 71. EX1007, ¶ [0015]. The panel is made from netting fabric 73. *Id*. Cook explicitly teaches that the netting acts to diffuse the light emitted by the light source. *Id*. ("The layer of netting 73 acts to diffuse or modify the light that it receives from the light source 49.").

131. I believe that a POSITA would have recognized the benefits of adding a fabric to this combination to aid in diffusing light and produce even more uniform and shadow-free illumination. The use of fabrics in photography, filming, and image capture has been known in the art much prior to the filing date of the '729 patent.

132. A POSITA would be motivated to apply Cook's teachings regarding fabric to the Naghi-Dine combination, as this merely involves the predictable addition of a fabric diffusor, a known lighting technology exemplified by Cook to

the Cheng-Dine combination based on its established function (the inherent diffuse reflection property of fabric, similar to a lamp-shade). Therefore, it is obvious.

2. Claim 9: "The illuminator device of claim 8, wherein said fabric is silk or muslin."

133. It is my opinion that Cook explicitly teaches that "[e]xamples of netting that are particularly useful are cotton, nylon, polyester or similar fabric netting having the ability to withstand high heat applications." EX1007, ¶ [0015].

134. It would have been obvious to a POSITA to try using muslin or silk as a diffusion fabric disposed between the light source and the subject's face.

135. This additional limitation is also within the routine technical capabilities of a POSITA, particularly given that Cook itself has already disclosed various similar fabric materials. EX1006, ¶ [0015]. Additionally, according to the Oxford English Dictionary (OED) Muslin is a type of cotton.[4] And cotton is explicitly taught by Cook. EX1006, ¶ [0015]. The OED also lists references to Muslin being a type of silk.[5]

136. It would nonetheless be obvious to a POSITA that any fabric that is transparent and provides diffusing light properties could be used. This could include silks, cottons, or suitable derivatives. It is not beyond the ordinary skill of a POSITA to select a fabric from different possible fabrics. And it would have been obvious to

[4] https://www.oed.com/dictionary/muslin_n?tl=true

[5] "All the cloathes of Gold and of Silke called Mossulines are wrought in Moxul." https://www.oed.com/dictionary/muslin_n?tl=true

a POSITA to try using muslin or silk as a diffusion fabric disposed between the light source and the subject's face.

I. Ground 4A: DeBreuil Renders Claims 10-13 Obvious Under 35 U.S.C. § 103 either Alone or in Combination with Dine.

1. Claim 10:

Preamble [10pre]: "<u>An illuminator device for illuminating one or more users in front of a web camera and a communications terminal having a frame and a screen comprising</u>"

137. I believe that DeBreuil discloses an illuminator device for illuminating one or more users in front of a web camera (video camera 215) and a communications terminal (video telephone 200/700) having a frame (screen assembly 220/720 and/or housing 220a/720a) and a screen (screen 220c/720c). EX1015, ¶¶ [0017], [0018].

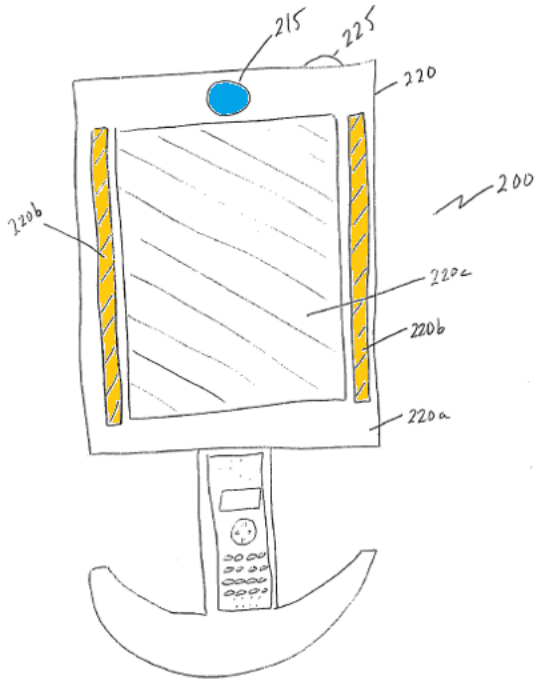


Figure 2

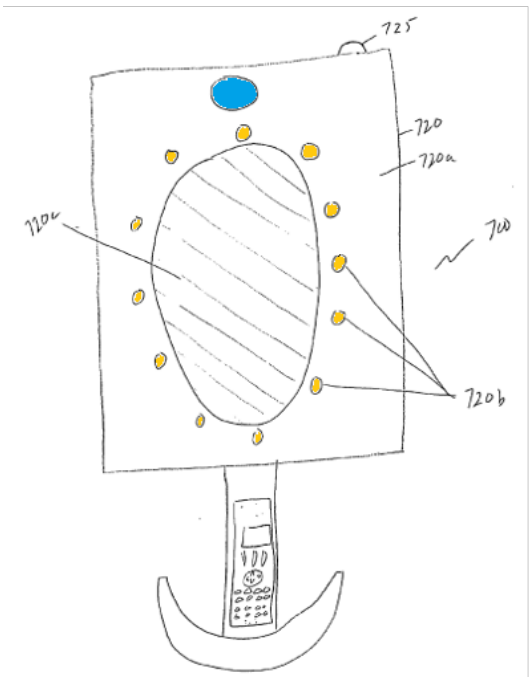


Figure 7

Element [10a]: "<u>a plurality of bulbs, wherein said plurality of bulbs are disposed in the frame of the terminal and one of said plurality of bulbs surrounds the web camera.</u>"

138. Du Breuil teaches a plurality of bulbs (light source 220b/720b) disposed in the frame (screen assembly 220/720 and/or housing 220a/720a) of the communications terminal (video telephone 200/700).

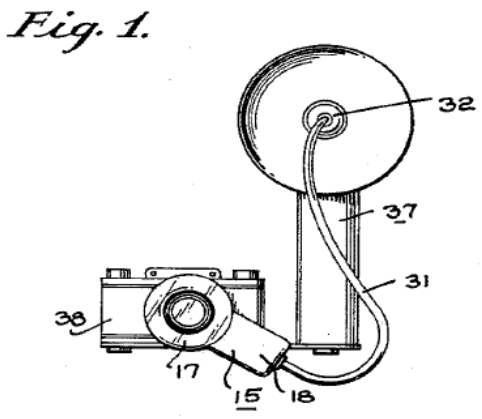
139. As depicted in Figure 2 the bulbs 220b are positioned on either side of the webcam 215 to achieve a surrounding effect projecting light from various positions around the webcam 215.

140. I believe that even if it is considered that these bulbs do not surround the webcam, then it would have been obvious to a POSITA to rearrange the bulbs in a manner to achieve a surrounding light effect to optimize the image, whether that

includes rearranging the bulbs or to reposition the bulbs to achieve a desired effect of diffused light that minimizes shadows. It is well within the ordinary knowledge of a POSITA to arrange bulbs in a manner to produce the desired illumination effect and to optimize the quality of the image.

141. A POSITA would have recognized that there was a limited number of places in the frame of the terminal where Du Breuil's light elements could be located: above, below, around, and to the sides of the camera. Any arrangements would have included one or more of those positions. Thus, rearranging the lights so that at least one light (*e.g.*, 220b) surrounded the web camera 215 would have been one of a limited number of possible positions/predictable solutions. One bulb could have easily been shaped to surround the webcam.

142. Second, this configuration of a bulb surrounding the webcam is obvious in consideration of the prior art. A POSITA would have found such a configuration obvious in view of Dine. Specifically, Dine teaches the attachment of a toroidal bulb "in close relation to and concentrically about the camera lens" so that the photographed subject is "uniformly illuminated virtually free of any shadow." EX1006 at 1:11-12. The camera lens of camera 38 is clearly depicted as being surrounded by the enclosure housing 17, which holds the toroidal bulb:



143. This positioning of the bulb relative to the camera lens improves image quality (e.g., by producing a uniform distribution of light without shadows), and therefore it would have been obvious to a POSITA that the arrangement of Du Breuil's frame-mounted lights could be modified to position one or more of the lights around Du Breuil's web camera as is taught by Dine.

2. Claim 11: "<u>The illuminator device of claim 10, wherein one of said plurality of bulbs is on one side of the web camera and another of said plurality of bulbs is on the other side of the web camera.</u>"

144. It is my opinion that Du Breuil explicitly teaches embodiments in which one of the plurality of bulbs is on one side of the web camera and another of the plurality of bulbs is on the other side of the web camera. EX1015, Figs. 2 & 7.

3. Claim 12: "<u>The illuminator device of claim 10, wherein in each of said plurality of bulbs are rectangularly shaped.</u>"

145. It is my opinion that Du Breuil explicitly teaches an embodiment in which each of the plurality of bulbs is rectangularly shaped. EX1015, Fig. 2.

4. Claim 13: "<u>The illuminator device of claim 10, wherein said plurality of bulbs are a plurality of electrodes spaced in the frame of the screen.</u>"

146. The term "electrodes" in claim 13 is not understandable within the context of the patent specification or the claim or within the field of lighting and electronics. The claim states "The illuminator device of claim 10, wherein said plurality of bulbs are a plurality of electrodes spaced in the frame of the screen." Electrodes are electrical connection elements of an electronic device so it is not clear how bulbs can be electrodes. Electrodes do not emit light. It is unclear how a bulb can be an "electrode." The specification of the '729 patent does use the term "electrode," seemingly interchangeably with "light." *See* EX1001 at 4:8-9 ("FIG. 5 shows a more decorative arrangement of lights or electrodes 100 much like a make-up mirror.") If we are to use this term interchangeably with lights, then Du Breuil explicitly teaches that the plurality of lights is "spaced in the frame of the screen." EX1015, Figs. 2 & 7.

I declare under penalty of perjury that the foregoing is true and correct

Date: 07/10/2025

Location: Ringgold, GA

Signature: /P. Morgan Pattison, Ph.D. /

P. Morgan Pattison, Ph.D.

Attachment A

P. Morgan Pattison
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(805)217-3878

Experience

Solid State Lighting Services, Inc. **November 2007 - Present**
Founder/President- Provide technical, strategic, and market expertise in the areas of LEDs, OLEDs, Lighting, Solid State Lighting (SSL), displays, and optoelectronic materials and devices. Horticultural lighting research and strategy. Light pollution measurement, evaluation, and mitigation. Scout and evaluate new technologies for development and investment.

U.S. Department of Energy **January 2008 - Present**
Senior Technical Advisor- Lead author of DOE Lighting R&D roadmaps. DOE funded R&D project. Coordinate cross-cutting R&D efforts. Lead DOE/USDA horticultural lighting research effort.

Blue Laser Fusion **April 2023 - Present**
Senior Technical Advisor- Coordinate external R&D and consultant efforts. R&D facility and site planning. Manage DOE, Japanese, Italian, California government relationships.

Luxx Lighting **August 2020 – April 2022**
Head of R&D- Develop advanced LED horticultural lighting products including spectral design, LED selection, and performance characterization. Coordinate grow studies with novel lighting prototypes.

U.S. Department of Energy **January 2006 – November 2007**
National Energy Technology Laboratory, Morgantown WV
Project Manager- Managed DOE funded R&D projects in SSL including LED and OLED lighting technologies. Managed solicitation and selection of new funded R&D projects. Identified priority areas of research necessary for advancement of SSL efficiency, performance, and price.

University of California, Santa Barbara **September 2000 – January 2006**
Graduate Student Researcher- Doctoral thesis research under Professor Shuji Nakamura (Nobel Prize in Physics 2014) on GaN based micro-cavity light emitting diodes. Research included: epitaxial structure design and growth by MOCVD, semiconductor process development, materials characterization, and electro-optical device characterization. Additional areas of research included UV LEDs, vertical cavity surface emitting laser (VCSEL), and edge emitting laser diodes.

Cymer Laser, San Diego **November 1996 – May 2000**
Laser Test Engineer- Tested and developed test methodology for production and prototype KrF and ArF excimer lasers used in deep UV photolithography for manufacturing of advanced semiconductor products. Testing included optical characterization and full system troubleshooting. Test development of new electrical and optical test methodologies to improve test cycle, Labview automation of test procedures, and development of test documentation.

Education

Ph.D. Materials Science, Electronic and Photonic Materials
University of California, Santa Barbara, 2006
Thesis: *Fabrication and Characterization of Gallium Nitride Based Micro-Cavity LEDs*
M.S. Electrical Engineering, Electronics and Photonics
University of California, Santa Barbara, 2003
B.S. Electrical Engineering, Electronic Devices and Materials
University of California, San Diego, 1996

Expertise

Optoelectronic materials and devices, lighting, LED, OLED, UV-LEDs, Germicidal UV application, R&D and technology evaluation, µLED-LED-OLED-Quantum Dot display technology, medical lighting, SSL product evaluation and selection, LED lighting product development, R&D Management, technology roadmapping, technical meeting moderation, technical writing, IP evaluation, trial expert witness, lighting color evaluation and selection, advanced lighting performance evaluation, Energy Star LED lighting testing, photometric characterization and testing, R&D Management, Federal R&D funding processes, R&D Proposal review and evaluation, ESCO contracts and performance measurement & verification (M&V), horticultural lighting, wildlife responses to light, human physiological responses to light, Laser Inertial Fusion Energy

Accreditations, Affiliations, and Professional Societies

Illuminating Engineering Society (IES) - Fellow
Chair – Outdoor Nighttime Environments (ONE) Committee
Voting Member – IES Horticultural Lighting Committee
Oregon State University, Civil and Construction Engineering, Courtesy Faculty
Lighting Certified (LC) by National Council on Qualifications for Lighting Professionals
Member: International Society of Horticultural Scientists (ISHS), International Dark-Sky Association (IDA), International Society for Optics and Photonics (SPIE), American Society of Agricultural and Biological Engineers (ASABE), American Physical Society (APS)
Project Management Professional (PMP) *Lapsed,* Project Management Institute (2006)
U.S. Government Contracting Officer's Representative (COR) (2006)

Leadership

Senior Technical and Strategic Advisor to DOE SSL R&D Program
Lead writer of DOE SSL R&D Opportunities, R&D Plan, and Multi-Year Program Plan
Technical content supervisor of annual DOE SSL R&D Workshops
Manage organization of DOE SSL topical R&D meetings on: LED devices and materials, OLEDs, luminaire integration, roadway lighting, germicidal ultraviolet (UV) LEDs, human physiological responses to light, domesticated and wild animal responses to light, roadway and area lighting, and horticultural lighting

New business creation/development –*Action Spectrum, Ultra-Yield Solutions, Guidance LED, Zuli, Canvas, Intellilight/Next, SSLS, Inc., Diel Lighting Science, Blue Laser Fusion*

Scientific Advisory Board member to *GLASE (Greenhouse Lighting and System Engineering)*, NYSERDA funded controlled environment agriculture R&D program

Technical Advisory Committee of Resource Innovation Institute

Advisory Board Member of *Phosphor Global Summit* annual meeting

Advisor to *Cyclotron Road* – Clean Technology Incubator at Lawrence Berkeley National Lab

Project sponsor for Senior Design Course at UCSB (2011-2012)

1. Design and development of spectro-goniophotometer
2. Design and development of smartphone light controller (co-founder and original board member of resulting company renamed *Zuli*)

Designed, fabricated, and characterized world's first gallium nitride microcavity LED

Fabricated and characterized world's first gallium nitride semipolar LED

Publications

Recent Progress for Commercializing IFE based on a novel high efficiency 10MJ laser and high-gain fuel target. Cohen, T., et al. (2025). *Optical Technologies for Inertial Fusion Energy,* 13358, 14-19.

Minimizing Ecological Impacts of Marine Energy Lighting. Reilly, C. E., Larson, J., Amerson, A. M., Staines, G. J., Haxel, J. H., & Pattison, P. M. (2022). *Journal of Marine Science and Engineering*, *10*(3), 354.

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DOE 2020 LED Manufacturing Supply Chain. Lee, K, Nubbe, V, Rego, B, Hansen, M, Pattison, M. *U.S. DOE Lighting R&D Program.* July 2021.

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Presentations

University of Perugia Faculty Seminar, Rensselaer Polytechnic Institute Leadership in Lighting class 2025, Georgia Tech NRE Seminar "Laser Inertial Fusion Energy and the Blue Laser Fusion Concept", 2024 Joint CEA Workshop, U.S. Fish & Wildlife Service Light Pollution & Bird Collisions expert panel, Workshop on Disorder in Semiconductor Physics and Devices 2024, University of Cincinnati IRIS 2023 Working Group, IES Raleigh Section "Horticultural Lighting – A Growing Opportunity", IES Street and Area Lighting Conference 2022, National Park Service Science and Technology – Skyglow Measurements at Channel Islands National Park 2022, UCSB Nitride Seminar 2022, International SSL Alliance 2021 General Assembly, The Limits of Food Production – Vertical Farming 2021, Horticann 2020, U.C. Davis Energy and Efficiency Institute, California Energy Administration, 2020 DOE Lighting R&D Workshop, Charleston Catholic High School STEM Seminar, East Tennessee State University Physics and Astronomy Seminar, IES Rocky Mountain Section – CU Boulder, 2019 DOE SSL R&D Workshop, Harvard ES-173 Guest Lecture, U.S. DOE Building Technologies Office Brown Bag Seminar, U.C. Santa Barbara Nitrides Seminar 2018, Phosphor Global Summit 2018, West Virginia State University – Biology Seminar, East Tennessee State University Entrepreneur Club 2018, IES Aviation Lighting Committee Meeting 2017 (Best Technical Paper), ICCEA Panama 2017, NCERA 101 Controlled Environment Agriculture meeting, DOE SSL R&D Workshop 2017, The College of New Jersey Physics Colloquium, DOE SSL R&D Workshop 2017, NREL 2016, Harvard University Engineering Seminar, LightSym 2016, DOE SSL R&D Workshop 2016, DOE SSL Technology development Workshop 2015, DOE SSL R&D Workshop 2015, IDTechX Internet of Things Applications, Phosphor Global Summit 2014, International Conference on Nitride Semiconductors 2013, IES Illuminate Philadelphia 2012, Strategies in Light 2012, Energy Efficiency Expo 2011, Tennessee Association of Physical Plant Administrators 2011, East Tennessee State University Faculty Development Sustainability Seminar 2011, LED Discovery 2010, Think Tomorrow Today 2008, International Conference on Nitride Semiconductors 2005, International Symposium on Blue Lasers and Light Emitting Diodes 2004, Fall Materials Research Society 2001.

Patents

Technique for growth and fabrication of semipolar (Ga, Al, In, B) N thin films, heterostructures, and devices. #9793435, #9231376, #8686466, #7846757, #10529892

Lighting unit having lighting strips with lighting elements and a remote luminescent material. #8491165

Lighting unit with heat dissipating chimney #8360607

Lighting unit with indirect light source #8684566 B2

System for monitor and control of equipment. #9432210

Semiconductor light emitting device #8227820, #8643036

Etching technique for the fabrication of thin (Al, In, Ga) N layers. #7795146

Semiconductor micro-cavity light emitting diode. Application # 11/510,240 (abandoned), WO2007025122