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Bill Cassarly, Ph.D.

Professional Experience

2013-Present Synopsys Scientist, Synopsys
2010-2013 Senior Scientist/Illumination Engineering, Synopsys
2006-2010 Senior Scientist/Illumination Engineering, Optical Research Associates
1996-2005 Senior Systems Engineer/Illumination, Optical Research Associates
1992-1996 Optical Scientist, GE Lighting
1991-1992 Technical Staff, GE Corporate Research and Development
1987-1991 Electro-Optic Engineer, GE Astro-Space
1985-1987 Advanced Course Supervisor, GE Astro-Space
1983-1985 Edison Engineer, GE Electronics Laboratory & GE Astro-Space

Education

1990 Ph.D., Degree in Electrical Engineering, University of Pennsylvania
1982 BSEE, Degree in Electrical Engineering (plus Math Minor), Bucknell University

He is a driving force in the movement to create the field of computer-aided illumination engineering. His efforts include illumination freeform design, illumination optimization, illumination engineering consulting, numerous papers and invited talks, educational course development, and intellectual property development. Some highlights of his efforts include two SPIE illumination courses, submitting the winning solution for the 2006 IODC and 2010 IODC Illumination Design Problem, and authoring a chapter in the OSA Handbook of Optics on Illumination Engineering. In addition, he is the inventor on 48 US patents, the optics developer for the TIROS lens for LED flashlights. He is also a key contributor to major feature developments in LightTools® including Freeform Designer, Measured BSDF, Backlight Pattern Optimization, and the first in the industry introduction of a practical and effective optimization environment for illumination systems.

He has worked extensively in the areas of illumination modeling, design, and optimization. Areas of special emphasis include; etendue limited systems, non-imaging optics, LED optics, backlights, lightpipe systems, high brightness LED and discharge source development, photometry, and lens-reflector design. Systems he has designed and which have been demonstrated include: fiber optic headlights, compound parabolic concentrators, fiber optic systems, laser illuminators, light pipe systems, theater projection illuminators, video projection illuminators, room lighting, informational signs, spotlights, floodlights, and UV systems. He has developed optics for halogen infrared, ceramic metal halide, standard metal halide, halogen, and electrodeless lamp products.

He joined the research staff of GE Corporate Research and Development in 1991, continuing as Principle Investigator for the Phase-Integrated-Laser-Optic-Transmitter program that was started at GE Astro-Space. Primary areas of research included non-imaging optics, laser diode arrays, liquid crystal devices, coherent

wavefront control, and flame spectroscopy. He also won a position on the Bridge Program, a GE CRD technology transfer program. While at GE, he received numerous GE management awards for patents and product introduction efforts.

He obtained his Ph.D. with a dissertation focused on liquid crystal arrays for signal processing and coherent wavefront control while working at GE Astro-Space. GE research focused on liquid crystal phase control arrays for laser communication systems, liquid crystal device development, intra-cavity laser diode wavefront correction, and Fourier optic mathematics.

His career with GE began in the Edison Engineering program, with assignments in space radiation effects, signal processing communication systems, and speech wavefront analysis. Following this, he supervised an advanced course in engineering at GE Astro-Space, a Masters in Engineering training program for top GE Engineers, where he was responsible for teaching more than 30 people each year.

Awards/Honors

- 2018 OSA Outstanding Reviewer
- 2011 Promoted to Fellow by the Society of Photographic Instrumentation Engineers (SPIE).
- 2010 Winner of 2010 International Optical Design Conference Illumination Design Problem.
- 2006 Winner of 2006 International Optical Design Conference Illumination Design Problem.
- 2004 Commendation for Excellence in Technical Writing from Laser Focus World
- 1994 GE Lighting General Manager Award for XMH60 Product Development.
- 1990 GE Astro-Space Technical Excellence Award for significant technical contributions.
- 1988 GE Corporate D. R. Mack Advanced Course Supervisor Award for demonstrated leadership.

Patents (50 US utility, 2 US Design, Non-US not listed)

- US 10,437,049 Optical design using freeform tailoring
- US 10,151,921 Optical design using freeform tailoring
- U.S. 9,075,177 Enhancing structures with a plurality of arrays of elongate features.
- U.S. 8,348,488 Elongated solid luminaire with light-emitting portion with first and second extraction regions spatially divided along the longitudinal axis thereof
- U.S. 7,866,871 Light enhancing structures with a plurality of arrays of elongate features
- U.S. 7,777,955 Rippled mixers for uniformity and color mixing
- U.S. 7,674,028 Light enhancing structures with multiple arrays of elongate features of varying characteristics
- U.S. 7,651,243 Phosphor wheel illuminator
- U.S. 7,588,342 Lighted refrigerated display case with remote light source
- U.S. 7,549,783 Efficient luminaire with directional side-light extraction
- U.S. 7,545,569 Optical apparatus with flipped compound prism structures
- U.S. 7,374,313 Luminaire with improved lateral illuminance control
- U.S. 7,366,393 Light enhancing structures with three or more arrays of elongate features
- U.S. 7,360,899 Beamsplitting structures and methods in optical systems
- U.S. 7,330,632 Fiberoptic luminaire with scattering and specular side-light extractor patterns
- U.S. 7,277,609 Methods for manipulating light extraction from a light guide
- U.S. 7,206,133 Light distribution apparatus and methods for illuminating optical systems
- U.S. 7,196,849 Apparatus and methods for illuminating optical systems
- U.S. 7,163,326 Efficient luminaire with directional side-light extraction
- U.S. 6,864,861 Image generator having a miniature display device

U.S. 6,819,505	Internally reflective ellipsoidal collector with projection lens
U.S. 6,488,389	Image generator having an improved illumination system
U.S. 6,280,054	Image generator having an improved illumination system
U.S. 6,220,740	High efficiency dual output light source
U.S. 6,219,480	Optical coupler for coupling light between one and a plurality of light ports
U.S. 6,192,176	Compact optical system with turn and color mixing
U.S. 5,927,849	Low angle, dual port light coupling arrangement
U.S. 5,924,792	Modular dual port central lighting system
U.S. 5,896,004	Double ended quartz lamp with end bend control
U.S. 5,877,681	System and method for broadcasting colored light for emergency signaling
U.S. 5,842,765	Tricolor lighting system
U.S. 5,826,963	Low angle, dual port light coupling arrangement
U.S. 5,812,713	Optical coupling system with bend
U.S. 5,774,608	Optical coupling systems with bend
U.S. 5,692,091	Compact optical coupling systems
U.S. 5,691,696	System and method for broadcasting colored light for emergency signals
U.S. 5,675,677	Lamp-to-light guide coupling arrangement for an electrodeless high intensity discharge lamp
U.S. 5,664,863	Compact uniform beam spreader for a high brightness centralized lighting system
U.S. 5,654,610	Electrodeless discharge lamp having a neon fill
U.S. 5,636,915	High brightness projection lighting system
U.S. 5,567,031	High efficiency dual output light source
U.S. 5,563,977	Display system having greyscale control of fiber optic delivered light output
U.S. 5,560,699	Optical coupling arrangement between a lamp and a light guide
U.S. 5,515,243	Retrofit optical assembly for lighting system
U.S. 5,469,337	Multiple port high brightness centralized lighting system
U.S. 5,420,769	High temperature lamp assembly with improved thermal management properties
U.S. 5,317,484	Collection optics for high brightness discharge light source
U.S. 5,107,357	Low insertion loss optical beam steerer
U.S. 5,059,008	Wide angle beam steerer using translation of plural lens arrays
U.S. 5,015,080	Continuous wide angle beam steerer using lens translation and phase shifter
D 508,510	Optical Lens (To Be Reissued)
D 511,787	Optical Lens (To Be Reissued)

Publications

“Design of Efficient Illumination Systems,” SPIE Short Course presented 1-3 times per year starting July 1999.

"Quantum dot design for display applications" (with Y. Ding), Nonimaging Optics: Efficient Design for Illumination and Concentration XIX, Vol 13132, SPIE, 2024

"Mixing rod with embedded mirrors" (with H. J. D. Johnsen), Nonimaging Optics: Efficient Design for Illumination and Concentration XIX, Vol 13132, SPIE, 2024

"Turn-mixer with spatial and angular uniformity." Illumination Optics VII. Vol. 13022. SPIE, 2024.

"Estimating the irradiance of a perturbed surface under an extended source." (with W. Kim and J.P. Rolland), Optics Express 32.12 (2024): 20959-20975.

"Sequence ray trace for efficient and robust stray light analysis." (with Y. Fang), Optical Architectures for Displays and Sensing in Augmented, Virtual, and Mixed Reality (AR, VR, MR) V. Vol. 12913. SPIE, 2024.

"Simulation-based computation of the glare spread function in camera systems" (with T. L. R. Davenport and B. Crowther), Optical Architectures for Displays and Sensing in Augmented, Virtual, and Mixed Reality (AR, VR, MR) Vol. 12913. SPIE, 2024.

"Recent advances in tolerancing illumination optics." (Invited) (with W. Kim and J.P. Rolland) International Optical Design Conference 2023. Vol. 12798. SPIE, 2023.

"Illumination design problem: the unicorn's horn." (with J. Muschaweck, H. Rehn, J Koshel, and L. Smeesters) International Optical Design Conference 2023. Vol. 12798. SPIE, 2023.

"Illumination Modeling and AI Optimization for Displays" (Invited), AG63-2, IMID 2023

"Design, fabrication, and characterization of a tunable LED-based illuminator using refractive freeform arrays." (with S. Shadalou, D. Gurganus, M.A. Davies, and T.J. Suleski.) Optics Express 30, no. 23 (2022): 42749-42761.

"IODC 2021 illumination design problem: the curse of Prince Lambert", (with J. Muschaweck, H. Rehn, and J. Koshel) Proc. SPIE 12078, International Optical Design Conference 2021, 120781Z (19 November 2021); <https://doi.org/10.1117/12.2605496>

"Compound surface descriptions in illumination design" (Invited) (with Y Fang), Proc. SPIE 12078, International Optical Design Conference 2021, 1207812 (19 November 2021); <https://doi.org/10.1117/12.2603647>

"Modeling interference using Monte Carlo ray trace", (Invited) (with A. Lin) Proc. SPIE 11874, Illumination Optics VI, 118740A (13 September 2021); <https://doi.org/10.1117/12.2596775>

"Tunable LED-based illuminator using freeform arrays", (with S. Shadalou and T.J. Suleski) Proc. SPIE 12078, International Optical Design Conference 2021, 120780I (19 November 2021); <https://doi.org/10.1117/12.2603627>

"Tunable illumination for LED-based systems using refractive freeform arrays." (with S. Shadalou and T.J. Suleski) Optics Express 29.22 (2021): 35755-35764.

"Applying Laplacian Magic Mirror in Freeform Illumination Optics Tolerancing", (with W. Kim and J.P. Rolland) Proc. SPIE 11874, Illumination Optics VI, 118740P (12 September 2021); <https://doi.org/10.1117/12.2596898>

"Connecting tolerancing of freeform surface deformation in illumination optics with the Laplacian magic mirror. ", (with W. Kim and J.P. Rolland) Optics Express 29.24 (2021): 40559-40571.

"Freeform optics for dynamic illumination", (with S. Shadalou and T. J. Suleski) Proceedings Volume 11495, Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XVII; 114950B (2020)

2021 IODC Illumination Design Problem Statement (<https://www.iodc.info/2020/09/2021-illumination-design-problem>)

"Interplay of Freeform Tailoring and Tolerancing," (Invited) in Optical Design and Fabrication 2019 (Freeform, OFT), OSA Technical Digest (Optical Society of America, 2019), paper FT1B.1.

"Fast tolerance analysis of optical systems for illumination" (with L. Zugby, V. Bora, T. Kuper) Proc. SPIE 10747 (19 August 2018)

"Demystifying Etendue", Plenary Presentation at SPIE Optical Systems Design Conference 2018 (May 2018). Also presented at the 2018 SPIE Optics and Photonics Illumination Technical Event.

"IODC 2017 Illumination Design Problem: The centennial Illuminator" (with H. Rehn and A. Herkommer), IODC paper #ODC17-69 (2017)

"Using Pinhole Images to Understand Nonimaging Optics", International Optical Design Conference, SPIE IODC paper #ODC17-70 (2017) and "Using Pinhole Images to Understand Nonimaging Optics", International Optical Design Conference. Optical Society of America, 2017 (2017)

"Parametric model of volumetric scattering," (with S. Magarill, D. R. Jenkins, Y. Yang, X. Yu, and G. Liu) Proc. SPIE 10590, International Optical Design Conference 2017, 1059023 (27 November 2017);

"Illumination Design for Consumer Electronic Applications", Tutorial presented at Frontiers in Optics 2016.

"Mixed-level simulation of opto-electronic devices," (with Bahl, Heller, Cassarly, Scarmozzino, et al.) 2016 International Conference on Numerical Simulation of Optoelectronic Devices (NUSOD), Sydney, NSW, 2016, pp. 101-102.

"Freeform Illumination On Curved Near Field Surfaces." 10th Annual International Conference on Optics-photonics Design and Fabrication (ODF16), Paper 2SS-02, 2016.

"The Progress of Illumination Simulation and Future Trends", (with C. T. Walker and M. Hayford), 10th Annual International Conference on Optics-photonics Design and Fabrication (ODF16), Paper 29S1-14, 2016.

"Accounting for coherent effects in the ray-tracing of light-emitting diodes with interface gratings via mixed-level simulation." (with M. Bahl, E. Heller and R. Scarmozzino), Optical Engineering 55.1 (2016): 015102-015102.

"Software tools design freeform optics for illumination." (with Jake Jacobsen), Laser Focus World 52.1 (2016): 92-95.

"Simulating Light Conversion in mid-power LEDs." (with A. Alexeev, V. D. Hildenbrand, O. Tapaninen, A. Sitomaniemi, A. Wondergem.), Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems (EuroSimE), 2016 17th International Conference on (pp. 1-7). IEEE.

"Accounting for coherent effects in the ray-tracing of light-emitting diodes with interface gratings via mixed-level simulation." (with M. Bahl; G. Zhou; E. Heller; W. Cassarly; M. Jiang; R. Scarmozzino; and G. Gregory), Optical Engineering 55.1 (2016): 015102-015102. (and the associated SPIE conference paper)

"Illumination system design with multi-step optimization." (with S. Magarill) SPIE Optical Engineering+ Applications. International Society for Optics and Photonics, 2015.

"Modeling scattering in turbid media using the Gegenbauer phase function." (with K. Calabro) SPIE BiOS. International Society for Optics and Photonics, 2015.

"Mixed-level optical simulations of light-emitting diodes based on a combination of rigorous electromagnetic solvers and Monte Carlo ray-tracing methods." (with Mayank Bahl, Guirong Zhou, Evan Heller, Mingming Jiang, Robert Scarmozzino, G. Groot Gregory, and Daniel Herrmann) Optical Engineering 54.4 (2015): 045105-045105.

"IODC 2014 Illumination design problem: the Cinderella Lamp", Proc. SPIE 9293, International Optical Design Conference 2014, 929304 (December 17, 2014);

"Optical simulations of organic light-emitting diodes through a combination of rigorous electromagnetic solvers and Monte Carlo raytracing methods," (with M. Bahl, G.-R. Zhou, E. Heller, W. Cassarly, M. Jiang, R. Scarmozzino, G. G. Gregory) Proc. SPIE 9190 (Sept. 18, 2014)

"A look into the world of Nonimaging Optics", (with J. Chavez and P. Benitez), OSA Webinar, (July 2013)

"Lightpipe Design", in Illumination Engineering: Design with Nonimaging Optics (ed R. J. Koschel), John Wiley & Sons, Inc., Hoboken, NJ, USA. (2013)

"Target flux estimation by calculating intersections between neighboring conic reflector patches" (with C. Canavesi and J. P. Rolland), Optics Letters, Vol. 38, Issue 23, pp. 5012-5015 (2013)

"Application of Conic Intersection Properties to Freeform Reflector Design" (with C. Canavesi and J. P. Rolland), Proc. Freeform Optics (Freeform) FT2B.2 (2013)

"Supporting conic design methods and conic intersection properties" (with C. Canavesi and J. P. Rolland), Opt. Eng. 53(3), 031306 (Nov 21, 2013).

"Supporting conic design methods and conic intersection properties" with C. Canavesi and J. P. Rolland, Proc. SPIE 8834, Nonimaging Optics: Efficient Design for Illumination and Solar Concentration X, 88340L (September 18, 2013)

"Observations on the linear programming formulation of the single reflector design problem", (with C. Canavesi and J. P. Rolland), Optics Express, Vol. 20, Issue 4, pp. 4050-4055 (2012)

"Implementation of the linear programming algorithm for freeform reflector design", (with C. Canavesi and J. P. Rolland), Proc. SPIE 8485, (2012)

"Direct calculation algorithm for two-dimensional reflector design", (with C. Canavesi and J. P. Rolland), Optics Letters, Vol. 37, Issue 18, pp. 3852-3854 (2012)

"Relationship Between Supporting Paraboloids and Linear Programming for 2D Reflector Design", (with C. Canavesi and J. P. Rolland), Frontiers in Optics, General Optical Design and Instrumentation III (FTh3E) (2012)

"Lightpipe device for delivery of uniform illumination for photodynamic therapy of the oral cavity", (with C. Canavesi, T.H. Foster, and J.P. Rolland), Applied Optics, Vol. 50, Issue 16, pp. 2322-2325 (2011)

"Using the on-axis BSDF at a dielectric surface to model the BSDF at off-axis angles", Proc. SPIE 8170, (2011)

“Illumination devices for uniform delivery of light to the oral cavity for photodynamic therapy”, (with C. Canavesi, T.H. Foster, and J.P. Rolland), Proc. SPIE 8124, (2011)

“Freeform optics design advances lighting and illumination” (with F.Fournier), Laser Focus World, March (2011)

“Fast freeform reflector generation using source-target maps”, F. Fournier with J. Rolland, Optics Express, 18, 5295-3404, (2010).

“Light Source Modeling,” SPIE Short Course presented 1-2 times per year (2000 to 2005).

“Illumination devices for photodynamic therapy of the oral cavity,” (with C. Canavesi, F. Fournier, T. H. Foster, and J. P. Rolland) Biomedical Optics Express, Vol. 1, Issue 5, pp. 1480-1490 (2010)

“Iterative Reflector Design Using a Cumulative Flux Compensation Approach”, SPIE/IODC 2010

“Freeform Reflector Design Using Integrable Maps,” (with F.R.Fournier and J.P. Rolland) SPIE/IODC 2010

“Fast freeform reflector generation using source-target maps,” (with F.R.Fournier and J.P. Rolland) Optics Express, Vol. 18, Issue 5, pp. 5295-5304, 2010

“Nonimaging Optics: Concentration and Illumination”, OSA Handbook of Optics, 3rd Edition, Volume II, Chapter 39 (2009).

“Designing freeform reflectors for extended sources,” (with F.R.Fournier and J.P. Rolland), SPIE Vol 7423, 2009

“Tailored Freeform Reflectors for Extended Non-Lambertian Sources,” (with F.R.Fournier and J.P. Rolland) Frontiers in Optics, 2009

“Method to improve spatial uniformity with lightpipes,” (with F.R.Fournier and J.P. Rolland) Optics Letters, Vol. 33, No. 11, pp 1165-1167, 2008

“Recent advances in mixing rods,” SPIE Vol 7103, September 2008

“Optimization of single reflectors for extended sources,” (with F.R.Fournier and J.P. Rolland) SPIE Vol 7103, 2008

“High Brightness LEDs”, OPN, January 2008.

“Backlight Pattern Optimization”, SPIE Vol 6834, Paper 191, November 2007.

“Illumination Merit Functions”, SPIE Vol 6670, September 2007.

“Advanced Helmet Mounted Display (AHMD)”, (with A. Sisodia, M. Bayer, P. Townley-Smith, B. Nash; J. Little, and A. Gupta) SPIE 6557, May 2007.

“Rippled Mixers for Uniformity”, Illumination Technical Group talk, SPIE Annual, (August 2006).

“Optimizing density patterns to achieve desired light extraction for displays,” (with T. Davenport), International Optical Design Conference, Proc. SPIE 6342, (June 2006).

“Non-rotationally symmetric mixing rods,” (with T. Davenport), International Optical Design Conference, Proc. SPIE 6342, (June 2006).

"Automotive Interior Lighting System Design and Optimization," (with J. Li and M. Hayford), Transactions of the Society of Automotive Engineers of Japan, 36, 5, 217-222, (September 2005).

“Optimizing angle-to-area-converting, light-piping systems using surface features,” (with T. Davenport and T. Hough), Proc. SPIE 5942, (August 2005).

“LED Source Modeling,” Strategies in Light Workshop, (February 7, 2005).

“Noise tolerant illumination optimization applied to display devices,” (with B. Irving), Proc. SPIE 5638, (February 2005).

“Automated Optimization Advances Software for Illumination Design,” Laser Focus World, (November 2004). “Optimization for efficient angle-to-area conversion in illumination systems,” (with T. Davenport and T. Hough), Proc. SPIE 5524, (October 2004).

“Better Illumination Design Through Automated Optimization,” (with T. Hough and T. Davenport), Photonics Spectra, (October 2004).

“Optimization for illumination systems: the next level of design,” (with T. Davenport and T. Hough), Proc. SPIE 5456, (September 2004).

“Taming light using nonimaging optics,” Invited paper, Proc. SPIE 5185, (January 2004).

“The art of making efficient illuminator design fun,” Invited paper, Proc. SPIE 5186, (November 2003).

“From Out of the Dark: Fun Illumination Demonstrations,” Invited OSA Talk, (October 6, 2003).

“Taming Light,” OE Magazine, 16-18, (December 2002).

“Illumination Optimization: The Revolution Has Begun,” (with M. Hayford), International Optical Design Conference, Proc. SPIE 4832, (December 2002).

“LED Modeling: Pros and Cons of Common Methods,” Photonics Tech Briefs, NASA Tech Briefs, Ila – 2a, (April 2002).

"Accurate Illumination System Predictions Using Measured Spatial Luminance Distributions," (with D. Jenkins and H. Mönch), Proc. SPIE 4775, (August 2002).

“Error estimation and smoothing of 2D illumination and chromaticity distributions,” (with E. Fest and D. Jenkins), Proc. SPIE 4769, (September 2002).

“Nonimaging Optics: Concentration and Illumination,” OSA Handbook of Optics 3, Chap 2, (2001).

“Automating the Illumination Design Process Using Optimization,” Invited talk, OSA Annual Meeting, (October 17, 2001).

“Automating the Illumination Design Process with Optimization,” Invited talk, Optical Design Symposium, Munich, Germany, (October 26, 2001).

“Lightpipes: Hidden Devices That Light Our World,” (with D. Jenkins, A. Gupta, and J. Koshel), OPN 12, 8, (2001).

"Dissecting the Optics of an LED," University of Arizona Optical Sciences Colloquium, (April 26, 2001).

“Designing Efficient Illumination Systems: The Art of Uniformly Coupling Flux From a Source,” 2nd International Conference on Optical Design and Fabrication, Tokyo, (November 2000).

“Analysis of Single Lens Arrays Using Convolution,” (with A. Riser), Optical Engineering 40, 5, 805-813, (2001).

“Automated Design of a Uniform Distribution Using Faceted Reflectors,” (with T. Davenport, S. David, D. Jenkins, and A. Riser), Optical Engineering 39, 7, 1830-1839, (2000).

“Optimization Methods for Illuminators for sub-100nm Lithography,” (with K. Thompson, T. Kuper, J. McGuire, T. Davenport, R. Shack), DARPA Advanced Lithography Conference, Oral Presentation, (May 2000).

“Fiber Optic Lighting: The Transition from Specialty Applications to Mainstream Lighting,” (with J. M. Davenport), SAE, 1999-01-0304, (1999).

“Advances in Fiber Optics: Fiber Applications Move into the Mainstream,” (with J. Davenport), The 8th International Symposium on the Science and Technology of Light Sources (LS-8), (September 1998).

“Faceted Reflector Design for Uniform Illumination,” (with S. David and C. Walker), Presented at International Optical Design Conference, Kona, Hawaii, Proc. SPIE 3482, (1998).

“Computer Software Tools Used in Illumination System Design,” Invited Oral Presentation, SAE International Congress and Exposition, (1998).

“Changes in Angular and Spatial Distribution Introduced into Fiber Optic Headlamp Systems by the Fiber Optic Cables,” (with G. Allen, R. Buelow, T. Davenport, R. Hansler, and T. Stenger), Presented at SAE International Congress and Exposition, 981197 (1998).

“Illumination System Design Using Optical Solid Modeling Software,” (with M. Hayford), Invited Oral Presentation, OSA Annual Meeting, (1997).

“Comparison of Dual Focus Collector Schemes for Fiber Systems,” (with G. Allen, T. Davenport, and R. Hansler), SAE International Congress and Exposition, 970254, (1997).

“Uniform Light Delivery Systems,” (with J. Davenport and R. Hansler), Presented at SAE International Congress and Exposition, 960490 (1996).

“Distributed Lighting Systems: Uniform Light Delivery,” (with J. Davenport and R. Hansler), SAE International Congress, Book SP-1081, SAE Transaction 104, 6, 950904, (1995).

“Phase Locking of a Two-dimensional semi-Semiconductor Laser Array in an External Talbot Cavity,” (with J. Ehlert, J. Finlan, K. Flood, D. Nam, S. Sanders, R. Waarts, and D. Welch), Proc. SPIE 2148, 72, (1994).

“High Power Coherent Two-dimensional Semiconductor Laser Array,” (with J. Ehlert, J. Finlan, K. Flood, D. Nam, S. Sanders, D. Scifres, R. Waarts, and D. Welch), Applied Physics Letters, 64, 12, 1478, (1994).

“Automated Phase Sensing and Control of an External Talbot Cavity Laser Diode Array Using Phase Contrast Imaging,” (with S. Chakmakjian, J. Ehlert, J. Finlan, and K. Flood), Applied Optics, 33, 24, 5550, (1994).

“Phased 2D Semiconductor Laser Array for High Coherent Output Power,” (with J. Ehlert, J. Finlan, K. Flood, D. Nam, D. Scifres, R. Waarts, and D. Welch), Proc. SPIE 1850, 270, (1993).

“Automated Two-Dimensional Phase Sensing and Control Using Phase Contrast Imaging,” (with S. Chakmakjian, J. Ehlert, J. Finlan, K. Flood, D. Harnesberger, D. Nam, R. Waarts, and D. Welch), Procs. SPIE 1634, 299, (1992).

“Semiconductor Laser Array in an External Talbot Cavity,” (with J. Ehlert, J. Finlan, K. Flood, D. Mehuys, D. Nam, R. Waarts, and D. Welch), Proc. SPIE 1634, 288 (1992).

“Intracavity Phase Correction of an External Talbot Cavity Laser Using Liquid Crystals,” (with J. Ehlert, J. Finlan, K. Flood, and R. Waarts), Optics Letters 17, 607, (1992).

“Liquid Crystal Inversion Wall Caused by Field Fringing,” (with S. Young), Mol Cryst. Liq. Cryst. 210, 1, (1992).

“900mW, CW Nearly Diffraction-Limited Output From a GaAlAs Semiconductor Laser Array in an External Talbot Cavity,” (with J. Ehlert, J. Finlan, K. Flood, D. Mehuys, D. Nam, D. Scifres, W. Streifer, R. Waarts, and D. Welch), CLEO-CWE7, (May 1991).

“Low Insertion Loss High Precision Liquid Crystal Optical Phased Array,” (with J. Ehlert and D. Henry), Proc. SPIE 1417, 110, (1991).

“A Nematic Liquid Crystal Phase and Amplitude Spatial Light Modulator for Optical Signal Processing Application,” Ph.D. Dissertation, University of Pennsylvania, (July 1990).

“Continuous Wide Angle Beam Steering Using Translation of Binary Microlens Arrays and a Liquid Crystal Phased Array,” (with J. M. Finlan, K. M. Flood, and C. Sigg), Proc. SPIE 1211, 296, (1990).

“Aperture Filling Using Phase-Plates at Self-Imaging Planes,” (with J. Finlan), OSA Annual Meeting, (1989).

“Phase Control of Coherent Diode Laser Arrays Using Liquid Crystals,” (with M. DeJule, J. Finlan, and C. Stein), Proc. SPIE 1043, 130 (1989).

“Effect of Word-Length Truncation on Quantized Gaussian Random Variables,” (with D. Morgan), IEEE, ASSP-34, 4, 1004, (1986).

“Voice Privacy for Cordless Telephones,” (with W. Ludescher), GOSAM, (June 1986).

Professional Societies

Fellow, SPIE

Committee Member, SPIE
2002-2017+

Member, OSA

Member, SAE

Member IESNA

The International Society for Optical Engineering

The International Society for Optical Engineering

Technical Member, International Optical Design Conference

Optical Society of America

The Society of Automotive Engineers

Illuminating Engineering Society of North America