

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
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

"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: Ed(11495-4269)(559)(ip)2.31(Te-4.13ip4.4)236.008-Tw/553781015d(Sd)(7)0E ID26De 01096

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

"Mixed-

“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).

“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). S338p(.)TJ 0.804p.9 (-el)4{6.3 (a)-1.7 (kj)6.3 (i)-4.6 (03 (w)1503 .7 (n,-8(ut) (u1(1.JE)6.2 (o2 (

Professional Societies

Fellow, SPIE

Committee Member, SPIE

The International Society for Optical Engineering

Executive Director

2005

2006

(2014-2016)

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