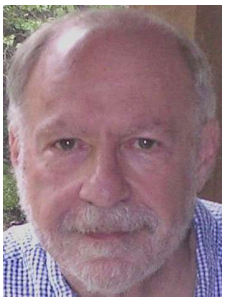
Lawrence Silverman

20220113 -v-2-6

Bio

Curiosity + Imagination + Knowledge + Experience

Lawrence Silverman has spent his career as a lighting and energy scientist, engineer, designer, inventor and industry visionary. He is a skilled product developer, creative lighting professional and experienced entrepreneur.



During more than 50 years of innovation, his work has spanned the fields of lighting, energy, multimedia entertainment, information technology, automation, communications and the Internet. Larry has a proven ability to create, communicate and commercialize original ideas and new product categories.

Larry first became interested in lighting as a student at MIT. He began to investigate the psychophysical effects of dynamic lighting on human perception, mood and health. He founded **Digital Lighting Corporation** (1971-1977), and originated the concept of computerized "Lighting Animation" with computerized lighting control systems of his own design (US Patent 3,869,699). This work advanced the art of creative lighting worldwide and has had lasting global impact in theater, music, architecture and entertainment. Digital Lighting technology was acquired by Lightolier Inc. in 1977 and is today part of Philips Lighting Signify Group (for additional information see Professional History following).

Larry next founded the first video music network in the US, **StarStream Productions** (1977-1980), in a partnership with Billboard Magazine. StarStream pioneered music television in the US. Its successful consumer field tests led to the formation of MTV by Warner-Amex in 1982. MTV adopted StarStream as its model and it became another worldwide phenomenon – music video.

Transtek International (1980-1993) was formed as a turn-key lighting design-build and equipment manufacturing company specialized in International projects. The Transtek team designed lighting and control, audio and video systems that were installed in projects throughout Mexico, Central America and in Europe. Transtek's lighting designs were widely published and won awards from the International Association of Lighting Designers and the American Institute of Architects. At Transtek, Larry further developed the next generation of lighting automation systems installed in these projects. He gained important insights into business and cultural issues across national boundaries.

In 1990, Larry founded **LightMedia Corporation** (1990-2002) to commercialize control systems and networking technology developed for Transtek. Larry led LightMedia in projects that included integrated lighting automation and "people tracking" systems for the estates of a former Chairman of Apple Computer, and for the Seattle home of a co-founder of Microsoft.

In 1994-97 Larry led a LightMedia co-development partnership with Raytheon on a small-scale commercial and residential Energy Management System (ECS-2000) for lighting and HVAC. The ECS-2000 was deployed in hundreds of US homes and small businesses in 1996-2000. Systems were piloted by energy and telecom utilities including Central and SouthWest (now AEP), The Southern Co., Detroit Edison, Wisconsin Bell and others. However utilities were unwilling to invest in customer-controlled equipment to enable end-users to consume less electricity, and the projects did not proceed beyond pilots.

In April 2002, Larry founded **Broadband Energy Networks Inc.** ("BEN"). Positioned at the intersection of broadband communication networks and energy automation, the objective was to extend and integrate user-side control networks (lighting, appliances, HVAC etc.) with Internet-based large scale energy and automation networks – an architecture for the user side of "Smart Grid" and the "Internet off Things" (IoT). He provided personal funds for BEN to acquire the assets of Coactive Networks, the first US company to create solutions to control and link local operating networks of devices to the Internet using multiple protocols. In 2004-5 BEN provided a comprehensive demonstration system to IBM that was installed in a "Smart Grid Demonstration Center" for Centerpoint Energy in Houston. In 2006, Larry negotiated a contract with IBM to become their worldwide partner in Smart Grid. Substantial additional capital was required to support an IBM-BEN roll-out, and BEN's outside investors refused to support the plan financially.

Larry separated from BEN in 2008 and incorporated **GridPlex Networks**, to work with the Galvin Electricity Initiative at Illinois Institute of Technology on solutions to improve the overall end-to-end performance of the

US electric grid. GridPlex acquired all assets of BEN in 2009. A major focus of the Initiative was to promote and enable small-scale intelligent clean energy micro-grids for end-users, rather than for utilities. GridPlex participated in research projects with IIT and Lockheed-Martin. A pilot system was built and installed at the Presidio Landmark Project – Belles Street Community in San Francisco – an upscale residential complex selected in 2009 as "the most sustainable community in the Bay area".

Larry was recognized by Robert Galvin Jr., retired Chairman of Motorola, and Kurt Yeager, former CEO of the Electric Power Research Institute, in their seminal book on MicroGrids "Perfect Power" (2009), as one of the people most likely to realize the concept of the intelligent community-scale "microgrids". GridPlex is involved in designing "Smart Community" products and systems that improve energy efficiency while providing new features and capabilities for end-users

In 2014, Larry's interest in lighting was reignited by opportunities to combine newly-introduced LED technology with sensor-based intelligent communication systems to create community-focussed networks. **LYTESENSE** was incorporated in 2016 to pursue this vision.

LED lighting has disrupted the lighting manufacturing industry and lighting design practice globally. LEDs enabled Larry to create lighting compositions that he had previously been able to visualize, but could not execute using pre-LED light sources that were too slow, large, color-limited and short-lived.

LyteSense is developing lighting equipment and sensor networks for human- and bio-centric applications that explore the benefits of variable-spectrum lighting on health, energy and wellness.

SUMMARY

During his 50-year career, Larry has created leading-edge technology for energy and lighting automation and conservation. He developed computerized animated entertainment and disco lighting, digital lighting control for architecture, music television, energy management, building automation and integrated, interoperable products and services for energy and the Internet.

Larry states that lighting is a fundamental starting point for learning about building, community and citywide IoT networks, since lighting is generally the most distributed and complex load in the built environment.

On July 6 2021, Larry was awarded US Patent # 20200138223A1 for a unique resilient communications system for a smart community. Additional patents are pending on smart city and community networks and on advanced transportation systems. patent Larry continues research and development on advanced energy, lighting, communications and information systems. He is active in a number of professional organizations, and has collaborated on recently published papers on the Ethics of Artificial Intelligence in IoT systems in Residences, and on the use of Modulated Visible Light for advanced communications ("LiFi").

A visual overview of his professional career is available on the web at **www.lawrencesilverman**.com.

Summary

1971-1977	**Digital Lighting Corporation**, NY, NY – founder and President – interactive lighting control and automation systems. Patented first computerized Lighting Animation system. Acquired by Lightolier Inc. (Div. Genlyte) and became Lightolier Controls. Genlyte acquired by Philips Lighting in 2007.
1977-1980	**Starstream Productions, Inc.**, NY. NY – founder and Executive Producer – first US video music network – partnership with Billboard Magazine; model for MTV which launched in 1982.
1980-1993	**Transtek International Ltd.**, NY, NY, London UK and Mexico City Mexico – founder and President – communications and controls development and systems integration for large-scale international projects in hotels, conference centers and cruise ships worldwide.
1992-2002	**LightMedia Corporation**, Upper Darby PA – founder & CEO – systems and applications for automation in buildings and homes; energy management systems and software. Technology licensed to Broadband Energy Networks and GRIDPLEX Inc.
2002-2008	**Broadband Energy Networks Inc.** – founder and President – interactive energy and information systems to manage critical resources (www.broadbandenergynetworks.com)
2008-present	**GRIDPLEX Networks** – founder and Chairman – automated networks for Conservation of Energy and Water to empower Green Communities Worldwide (www.gridplexnetworks.com)
2016-present	**LYTESENSE CORPORATION** – founder and Chief Scientist – automated LED lighting systems, advanced Lighting Animation and bio-centric lighting solutions
2017-present	**ARCOLOGIX** – Chairman and co-Director – software and firmware development using AI to track and manage elements of massively large real-world infrastructure systems
2020-present	**XTRAX** – founder and Chief Scientist – a unique Electric vehicle automation system
2019-present	**QUAANTA** – founder and Chief Scientist – a project to launch Native American Health Centers

Education: graduated Phillips Exeter Academy in 1963, MIT (1963-67), Physics and Cybernetics (entered at age 16). MIT varsity wrestling team. Left MIT in 1967 prior to receiving degree to found computer and interactive lighting controls company in NYC. Graduate studies in Film and New Media at the New School in NYC (1967-69).

Personal: Larry works and lives with his family in the Philadelphia metropolitan area.

A multi-media slide presentation can be found at www.lawrencesilverman.com

Professional History- detail

Digital Lighting Corporation, NY, NY (1971-77), President

Founded company, incorporated in 1971. Developed and patented a computerized multimedia lighting and energy control system, installed in high profile projects throughout the US. Systems used in architecture and design, film, theater, entertainment and energy management. Established distribution and rep network as well as OEM programs with major lighting manufacturers. Digital Lighting originated the concept for the LyteMode products and systems that are sold today by Lightolier (Div. Genlyte-Thomas) as their premium architectural lighting control system. Co-holder of US Patent 3,869,699 issued Mar. 4, 1975. Digital acquired in 1977-8 by Lightolier-Genlyte, becoming Lightolier Controls.

Digital Lighting control products — Design and development of modular commercial, architectural and entertainment lighting control products and systems distributed internationally.

Products designed and manufactured by Digital Lighting under Mr. Silverman's direction included:

- **PDC 6x9 Programmable Lighting Controller** – Interactive Control System User Interface (UL and NYC listed)
- **PDC – D2.4kW Programmable Dimmer Control** - power module and rack (UL and NYC listed)
- **LM System II Programmable PreSet Controllers** – including preset mastering system, remote preset panels, special effects panels, assignor panels and automatic inputs from timeclocks, photocells and sensors
- **PDC-3 System** – integrated programmable control system and power unit (UL). Sold by Altman Stage Lighting as "Galaxy" and by Swivelier as "StarTron".
- **Autofade** (for Lightolier) – programmable control unit for plug-in mounting on track-lighting
- **Video Replay and Display System** - Digital Video-to-Analog computerized lighting control system array – installed to operate scoreboard in Cleveland Stadium, used two Digital Equipment PDP-11s in parallel, digital dimmers connected to a 22,000 lamp display. Co-development with General Electric Lamp Division.
- **LyteMode** – (for Lightolier, now Genlyte Thomas) original designs and specifications for the programmable architectural lighting control system that is still the high-end control systems product for Lightolier Controls (see www.lolcontrols.com/products/Lytemode/Lytemode.asp).

Digital Lighting Projects — In 1971-1977, Digital Lighting designed systems using its technology in projects including:

- **Broadway musicals** — New York City. Custom electronic lighting systems and controls for **Chicago, Hair** (touring productions), **Pippin, Dancin', Jesus Christ Superstar.**
- **Independence Hall** — Philadelphia, PA. Light & Sound spectacular for the US Bicentennial.
- **General Electric Lighting Institute** — Nela Park, Ohio. Computerized lighting energy management system at G.E. Lighting headquarters
- **Cleveland Stadium Scoreboard** — Cleveland, Ohio. One of the world's first digital video computerized scoreboards capable of instant replays. Digital control system to control 22,400 lamps for digital video display 240x80. Collaboration with GE Lighting.
- **Windows on the World** — Lighting systems and design for the facilities at the top of the World Trade Center, New York, NY.
- **Tavern-on-the-Green** — Lighting controls and design for the facility in Central Park, New York, NY.
- **Studio 54** — NY, NY. Interactive electronic lighting control system for the most sensational discotheque in the world.
- **Saturday Night Fever** – Robert Stigwood Productions; lighting consultant for NYC production.
- **Thank God It's Friday** – Columbia Pictures; lighting consultant for Los Angeles production.
- **New York Playboy Club** — Multimedia entertainment systems, New York, NY.
- **Hollywood Palace** — Founded and developed concept for multimedia music TV theater & club, LA
- **White House Christmas Tree** – 1975-76. Control systems provider to General Electric

- **Lightolier, Inc.** — Design of the LyteModeª and Autofade™ Architectural lighting control products and systems

Awards

- **Illuminating Engineering Society of North America (IESNA) — Outstanding New Product** recognition from the IESNA in 1974 and 1975, and featured in LD+A, the Journal of the Illuminating Engineering Society
- **Illuminating Engineering Society (IESNA) —** nominated for the 1977 IES Lumen Award, the highest recognition in the lighting industry, for the development and use of programmable lighting automation systems.

Articles and Publications

- **1972 - Interior Design Magazine**, computerized lighting controls featured in "Home of the Future" special issue
- **1974-1975 – LD+A – Journal of the IESNA** - Outstanding New Products of 1974 and 1975 – Digital Lighting controls
- **1976 - LD+A – Journal of the IESNA** – cover story "An Architectural, energy-conserving electronic dimming system"
- **1976 - Newsweek Magazine**– featured in Nov, 1976 cover story "The Disco Whirl"
- **1976 – Forbes Magazine** – featured in June, 1976 article on "Discomania"
- **1977 - Business Week** – featured in July 1977 Market Observer column
- **1977 - LD+A – Journal of the IESNA** – June 1977 cover story "Lighting Controls program Entertainment"
- **1977 – Interiors Magazine** – cover story on Studio 54 design and lighting
- **1978 – Cleveland Plain Dealer**- "STADIUM FACTS" feature on innovative computerized instant-replay scoreboard

US Patents

Patent US 3,869,699 A (1975) Animated Sound-responsive lighting effects.

Industry committees:

- **Illuminating Engineering Society of North America (IESNA**) – Advisory Member of the Progress Committee of the IESNA for Electronic Controls from 1975-80.

Starstream Productions, Inc., NY. NY (1977-79), Founder & Executive Producer

Starstream Video Music Network — Conceived and developed the first TV-based video music network in the U.S. – "Starstream" – which was established by Mr. Silverman in partnership with Billboard Magazine in 1977. Mr. Silverman was the founder and Executive Producer. Originated and developed the TV video music entertainment format and secured, negotiated and licensed content from record and film companies.

Also responsible for the design and development of StarStream music video system, including satellite, stereo synthesis and video playback systems. Starstream led to the formation of the MTV Network by Warner-AMEX in 1981. The Hollywood Palace in Los Angeles was originally developed to become the anchor studio for production of StarStream music videos.

Articles and Publications

- **The History of MTV (published 1990) –** Author Tom McGrath recognized **StarStream,** co-developed by Mr. Silverman as a joint venture with Billboard Magazine, as the first Video Music network in the US, and the precursor to MTV.

Transtek International Ltd., NY, NY (1980-1993), Founder and President

Large-scale systems integration for international projects in hotels, corporate and convention centers and cruise liners. Systems included design, engineering, specification and supply of lighting, energy management, audio, video and communications systems.

1980 Winter Olympic Games — Lake Placid, New York. Official Consultant.
Televisa Networks — Mexico City Studios
Hotel Fiesta Americana Hotels — Guadalajara, Cancun, Tijuana, Mexico.
Pemex Tower — Mexico City, Mexico.
Sheraton International Hotels — Mexico City, St. Maarten, Rio de Janeiro, Cancun, Ixtapa
Hyatt International Hotels — Gibraltar, Paris France
Hilton International Hotel — Barcelona, Spain
Scott Paper Headquarters — Philadelphia, PA
Pennsylvania State House — House and Senate Majority Caucus Rooms, Harrisburg, PA
Franklin Institute Science Museum — Philadelphia, PA
Cunard Lines — Princess, Countess, Sagafjord and Vistafjord luxury cruiseliners.
Nikko Hotel — Mexico City, Mexico.
The Hollywood Palace — Hollywood, CA
Kings Mountain Theater — Woodside, CA

Transtek operated **QOR Technology Inc.** as a manufacturing subsidiary in 1985-92. Products developed and manufactured under Mr. Silverman's direction include:

- **LightMatrix™ - DMR 2400x4** - Digital Dimmer and integrated Power Control pack
- **LightMatrix™ - PGM 4x4 and REMx4** - User Interface programming and control panel

Awards

- **Lake Placid 1980 Winter Olympics –** honorary sponsorship in recognition of design and installation of lighting and entertainment systems in the Olympic Village and special shows to celebrate US Hockey Team victory
- **International Lighting Design –** 1986 **Edwin F. Guth International Illumination Design Assn. (I.I.D.A.) Award of Excellence** - Illuminating Engineering Society and the American Assn. of Interior Designers
- **International Hotel Design Magazine Award** for lighting – 1988 award from the AIA (Am. Institute of Architects)
- **American Society of Interior Designers (ASID) Award for Lighting Design –** 1988 Hotel Lighting
- **Philadelphia Chamber of Commerce - Exporter of the Year** – 1990
- **Pennsylvania Governor's Small Business Award – Exporter of the Year** – 1991
- **Philadelphia 100** – recognition by the Philadelphia Business Journal as one of the region's fast growth companies – 1992
- **U.S. Small Business Administration - "Exporter of the Year"**– Pennsylvania/Maryland Region **1992**

Articles and Publications

- **1983 – Designers West Magazine –** feature article on "The Palace" in Hollywood CA.
- **"Best of Lighting Design"** – projects published in the 1992 compendium of best lighting installations from around the world, edited by lighting critic, Wanda Jankowski.
- **1991 LD+A** – Journal of the Illuminating Engineering Society of N. America (IESNA) – cover story on the automated lighting system in the Train Room of the Franklin Institute in Philadelphia

LIGHTMEDIA CORPORATION, UPPER DARBY PA (1992-2000), FOUNDER AND CEO

Markkula Residence, Kings Mountain Project — Woodside, CA – 1992-94. Design, engineering and development of systems and controls for Mike Markkula, co-founder and former Chairman of Apple Computer, and founder of Echelon Corporation. This project provided the original test-bed for the Echelon control and communications technology, and included development of a LONWorks dimming system:

- **LightMatrix™ -LON** – Echelon-based LONworks Integrated Dimmer and preset controls

Neuron-based Control Systems and Software — 1992-94. Developed integrated hardware and software platform for interactive home and building automation. Prototyped TV-based user-interface and hospital-room products in collaboration with RCA.

Ameritech — Wisconsin Bell – 1993-94. Design and engineering of energy management and control systems using LONWorks™ technology in a Building Automation project to demonstrate remote network control of building systems.

Lakeside Residence — Medina, WA – 1993-94. Development work for the "people-tracking" system, an RF smart card system for the residence of one of the founders of Microsoft, as the primary input to the home automation and control system (not for public disclosure).

OpenHouse™ — 1995-96. OpenHouse™ - PC-and-TV-based Integrated Home Information and Control system software for residential gateways - developed as a prototype with Central and SouthWest electric utility.

Utility Energy Management Networks – 1994-97. Co-developed Energy Management and Communications Systems for electric utilities with Raytheon Company, the ECS-2000. Led user-interface and software design team that developed a small-scale Energy Management and Intelligent Information System installed in more than 3,000 residences and businesses by energy utilities around the US, including Central & SouthWest (Dallas TX), Detroit Edison (Detroit MI), The Southern Co. (Atlanta GA), and others.

The ECS-2000 Energy Management System delivered control signals, information and messaging over existing electric wiring and documented peak reduction in excess of 20%. Personally developed many of the user-screens for the Raytheon ECS-2000 User Interface Module, and managed the overall technology and software development effort.

Conceived, prototyped and demonstrated Universal Gateway™ interface software - BusinessLinc™ and Ne*X*TV™ - Internet-based platforms delivering value-added applications and services for information appliances, aimed at small-to-medium business and homes. Developed business and revenue model to support deployment of services to Internet-based user community. Conceived unique graphical user-interface and navigation system, using the NCI-OS protocol for interactive “thin-clients”, including information appliances and set-top boxes. Patent applications pending on several Internet-based communications, messaging and energy applications included.

Concept for Internet-based Information and Commerce Networks explored in demonstration projects with energy utilities around the US, including Detroit Edison, PECO, and Central SouthWest, for residential and commercial use.

Collaboration with Electric Power Research Institute (EPRI) and Oracle Corp. Network Computer Inc. (NCI) Div. — 1997-99. Conceived, prototyped and demonstrated Universal Gateway™ interface software - BusinessLinc™ and Ne*X*TV™ - Internet-based platforms to deliver value-added applications and services for information appliances, aimed at small-to-medium business and homes. Developed business and revenue model to support deployment of services to Internet-based user community. Conceived unique graphical user-interface and navigation system, using the NCI-OS protocol for interactive “thin-clients”, including information appliances and set-top boxes. Patent applications pending on several Internet-based communications, messaging and energy applications included in the platform.

Concept for Internet-based Information and Commerce Networks explored in demonstration projects with energy utilities around the US, including Detroit Edison, PECO Energy (now Exelon), and Central and SouthWest (now AEP), for both residential and commercial applications.

Articles and Publications

- **1992 – National Institute of Standards (NIST)** – Annual conference presentation: "The requirement for Sensors in Human-Computer interactions"
- **1994 - Delaware County Times** – Aug. Business Section feature "Making a House a Smart Home"
- **1996 – Annual Report of the Electric Power Research Institute (EPRI) –** special section on Systems and Telecommunications in the electric Industry – "The Energy Network Computer"
- **1997 - Philadelphia Inquirer** – Tech Life June 97 - feature article on future of computerized community networks

Industry committees

- **Standards Committee** of the **Electronic Industry Assn. (EIA)** to define and standardize the **Consumer Electronics Bus ("CEBus") Committee** (1988-90)
- **Echelon LonMark® Committee** establishing standards for network operating protocols and device profiles for system interoperability (1993-94),

Broadband Energy Networks Inc., Upper Darby PA (2002– 2008), Founder & President

Networked energy, information and automation services.

In Dec., 2002, acquired assets of Coactive Networks Inc., venture-backed leader in residential gateways, with original cost over $42M. Also acquired selected assets of Motorola's PowerCom Prepaid Metering Division (LON-based meter with remote data communications) in 2004. Developed C2k Utility Automation Computer – a multi-protocol universal gateway including LON, ModBus, ZWave, Zigbee &c gateway for IP integration with PLC, RF and wired media based on original Coactive Connector 2000.

- **CenterPoint Energy** – **Houston Advanced Technology Demonstration Center** – BEN was selected by IBM to participate in an installation to showcase advanced concepts for smart grid, smart cities and automated home and small business technology, performed in partnership with IBM, Broadband Energy, Echelon and several others. Demonstrated the benefits of Smart Grid and Smart City Technology.

  Provided End-User systems for IBM installed in thr Smart Grid BPL Demonstration Laboratory in Houston TX in 2004-5, including AMR, AMI and Customer Service systems and applications.

- **Rochester Public Services, Rochester MN** - BEN provided several Automated Demand Response demonstration systems installed in a 2006 EPRI-funded research project at.

Articles and Publications

- **"Perfect Power" –** included in "people and companies to watch", in the ground-breaking book about the transformation of the electric power business by Robert Galvin Jr., retired Chairman and CEO of Motorola, and Kurt Yeager, former head of the Electric Power Research Institute ("EPRI" - the "think-tank" of the electric industry).
- **2006- Philadelphia Business Journal –** Technology Section – Focus on Energy – Nov. 2006 feature article on Broadband Energy Networks.

US Patents

Patent US 8001256B1 Multiple Network Protocol Support (2011) [sold];

Awards

Best Management Team 2006 – Ben Franklin Partnership of SE PA, Philadelphia PA

Industry Presentations

Invited Speaker and Presenter at the following Industry Conferences:

- **Distributech 2004** - "The Utility of the Future" – joint presentation with Motorola

- **CleanTech Conferences** - 2006-8 in Washington DC, San Francisco CA and Shanghai China
- **Broadband Utility Conferences** – BPL Hong Kong 2007 and 2008
- **Grid InterOp** – Policy and Technology Presentation – 2008

GRIDPLEX NETWORKS LLC, Upper Darby PA (2009 – present), Chairman and Chief Scientist

In 2009, Mr. Silverman founded GridPlex Networks LLC, to focus on new applications around automated energy systems and "intelligent microgrids". The mission of the company is to utilize Smart Energy and related artificial-intelligence-based automation and IoT technology to benefit energy end-users in government, institutions, commercial and residential applications, empowering them to achieve their goals for energy conservation and sustainability.

Projects

- **Presidio Landmark Project –San Francisco CA. "Presidio Belles Street Community"** – an upscale multi-building residential community. Local PV electricity generation with monitoring and control systems for key building elements in all 29 units, public areas and management office. GridPlex developed energy management software applications to automate lighting, HVAC, hot-water hydronic floors and solar power input. Voted "the most sustainable community in the San Francisco area" in 2010.
- **Rochester MN Public Utility** – Energy Demand-side Monitoring and Automation – a pilot project to test Demand-side Management as an energy conservation tool.

Articles and Publications

Smart Grid Today – featured in multiple issues in 2009-2012 of this industry webzine

Continental Automated Buildings Assn. ("CABA") – co-authored a paper entitled "The Impact of AI and IoT in Intelligent Buildings" (2018) published in CABA white paper

Industry Presentations

- **CleanTech Conferences** – invited speaker in 2006-8 in Washington DC, San Francisco CA and Shanghai China
- **Broadband Utility Conferences** – invited speaker in Hong Kong Conferences 2009 and 2010
- **4th Annual "Smart Grid and Demand Response Conference"** – "Utility of the Future" - Chicago IL 2011
- **World Green Energy Symposium** – invited presenter on "Policy and Technology" – Washington DC June 2012

Industry Committees

- **GridWise Architecture Council (US Dept of Energy)** – adjunct member of group recommending standards to US DOE

LYTESENSE CORPORATION, West Chester PA (2019 -present), Chairman and Chief Scientist

LYTESENSE was formed to develop and commercialize Intelligent LED Lighting Equipment and Systems, including high-output LED lighting and bio-centric systems that integrate innovative LED light sources, advanced optics, sensors, networked communications and embedded automation. Focus on infrastructure and exterior lighting applications for universities and healthcare, municipalities, government and military.

Projects

- **Coopers Ferry Partners –Wiggins Park, Camden NJ – automated lighting sy stem** – innovative landscape and entertainment lighting system in an outdoor park & concert facility adjacent to Aquarium (2015-19)
- **Philadelphia Navy Yard – Philadelphia PA** – an exterior lighting animation system that can be remote-controlled and will execute a range of pre-programmed user-selectable lighting themes for special events, holidays, civic presentations throughout the year (2018-2020).

Patents

Emergency Neighborhood Communications Network - US Patent 11.051.644 B2 (issued July 6, 2021) for a Resilient Community Network with Smart Address ID and Secure Mailbox.