

- ❖ An experienced technology and business leader with over 20 years of industrial research, product development, and product commercialization experience and ~ 8 years of academic experience
- ❖ Co-inventor of III-V Oxidation Technology – fundamental to the fabrication of high-speed VCSELs and high-reliability LEDs
- ❖ Successfully commercialized 10GBASE-LX4 technology for 10 Gigabit Ethernet applications

Objective: To use my experience to help educate the next generation of engineers and technologists while conducting meaningful research on photonic materials, devices, and integration.

Relevant Experience:

2012 – Present University of Illinois at Urbana-Champaign

Professor, Department of Electrical and Computer Engineering (2018 - Present)

President's Executive Leadership Program Fellow (2019-2020), University Senate's Conference Executive Committee (2019-2020), Faculty Senate Executive Committee (2018-2020, Vice-Chair 2019-2020), College of Engineering Executive Committee (2019-2020), Department of Electrical and Computer Engineering Advisory Committee (2018-2020)

Associate Professor, Department of Electrical and Computer Engineering (2012 - 2018)

Key responsibilities include conducting research on photonic devices and photonic integration, teaching undergraduate and graduate level classes, and mentoring graduate students.

2010 – 2016 Skorpios Technologies, Inc.

Chief Technology Officer and Vice President, Co-Founder (Aug '10 – Dec '11), Chief Technology Adviser (Jan '12 – Oct '16): Skorpios develops photonic integrated circuits using composite semiconductor on insulator technology. This approach combines III-V materials for key photonic functions with optical components and CMOS circuits fabricated on SOI wafers.

Key responsibilities included defining the technology roadmap and IP strategy, leading the product development and product engineering effort, leading technical interactions with customers, leading the technical recruiting effort, supporting efforts to raise capital, and generating and tracking R&D budgets.

- ❖ Participated in close of "Series A" funding round. Inventor of key company IP.

2009 – 2010 MicroLink Devices, Inc.

Vice President: MicroLink Devices is a small technology company with a mix of revenue from government contracts and epitaxial wafer sales. MicroLink's core technologies include high-efficiency, multi-junction solar cells, epitaxial liftoff (ELO) for fabricating ultra-thin, flexible III-V devices, and III-V epitaxial growth.

Responsibilities included ownership of the operations and product development groups within the organization, directing R&D resources to meet program goals and deliverables on government contracts, preparing and supporting the preparation of R&D proposals, and recruiting at all levels of the organization. Approximately \$6 million in annual contract revenue was being managed, as well as an operations group with approximately \$5 million in annual product revenue (a total of ~20 people in these combined areas).

- ❖ Led the team formation, proposal preparation process and was awarded a contract (\$2.7 million) under the DARPA-BAA-09-45 Low-Cost Lightweight Photovoltaics (PoP) solicitation. This required the creation of a multi-organization team of both university and industry partners to develop portable, flexible photovoltaic solar sheets with high efficiency.

- ❖ Organized quarterly program reviews and kick-off meetings for government-sponsored research programs.
- ❖ Coordinated efforts to expand company IP portfolio, including international filing strategies.

1999 – 2009 Emcore Corporation, Molex Fiber Optics

Senior Director of Development and Engineering, Director of Module Development, Director of Strategic Technology: Lead a multi-disciplinary team developing and commercializing optical transceiver modules, optical components, and parallel optic modules for very high speed (>10 Gbps) data communication applications. Developed 10GBASE-LX4 modules in the XENPAK and X2 form factors. Led the commercialization efforts for Emcore's 10GBASE-LX4 XENPAK transceiver product (annual sales > \$20 million, cumulative sales over \$75 million) and coordinated efforts to transfer production to an overseas contract manufacturing partner. Managed interactions with Emcore's production, reliability, and quality teams during module qualification. Responsible for establishing product roadmaps and supporting division's M&A activities. Played key role in the Emcore acquisition of Intel's Optical Products Divisions (~\$110 million combined transaction), and lead Emcore's team responsible for the integration of this division into Emcore. Responsible for managing an ~\$10 million annual R&D budget in a division with ~\$60 million in annual revenue.

- ❖ Led a >50 person geographically dispersed and technically diverse research and development organization focused on optical components, tunable lasers, and high-speed optical transceivers.
- ❖ Established and managed Emcore's Branch Office in Taipei, which included IC development and optical transceiver design functions. This included working with law and accounting firms in Taiwan to establish a legal entity for Emcore, site identification, and configuring the space to support the technical functions of the team.
- ❖ Led technology transfer initiatives to contract manufacturing partners in Thailand and China.
- ❖ Led integration effort for Emcore's acquisition of Intel's Optical Products Division.
- ❖ Led effort to identify site and specify space build-out requirements to support development and engineering functions of Emcore's Illinois group following transition of group from Molex to Emcore.

Manager, Group Engineering: Manager of the Transceiver Development Group (~20 engineers at peak), including Molex's 10 Gigabit Ethernet transceiver development program, small form-factor transceiver development, parallel optical interconnect development, and optical coating manufacturing facility. Responsibilities included participation in IEEE standards activities (IEEE 802.3), preparing and delivering customer presentations, and technical evaluation of strategic investment and partnership opportunities. Technical work included leading Ethernet PMD-layer transceiver design, optical coating design and manufacturing, the development of low-threshold lasers for Gigabit Ethernet applications, research on advanced photonic devices for DWDM applications, and the establishment of a facility for manufacturing optical coatings. Responsible for managing an annual R&D budget of ~\$5 million dollars.

- ❖ Developed 10GBASE-LX4 optical transceivers for 10 Gigabit Ethernet applications.
- ❖ Key participant in IEEE 802.3ae (10 Gigabit Ethernet) standards effort, involved in drafting portions of the standard associated with 10GBASE-LX4, organized workshop and presented key work on technical feasibility of LX4 from a multi-company team.
- ❖ Leader of technical marketing efforts, including key customer engagements.
- ❖ Initiated efforts to sell Molex's optical transceiver group instead of shutting down business when Molex decided to exit active optical module market. Successfully transitioned team from Molex to Emcore.

1994 – 1999 Small Business Experience

Entrepreneurial Experience (Phoenix Photonix, Inc.): Business Founder, Chief Technical Officer, Member of Board of Directors

Prepare budget projections; develop business and manufacturing strategies; evaluate markets and competition; contribute to writing and refining business plans; make presentations to potential investors; design device fabrication facilities, project capital equipment needs for wafer processing and process support. Company Focus: Photonic components involving III-V oxides for DWDM applications.

❖ Business founder.

Consulting Company (Alumenox, Inc.): E-Systems, Molex Inc., Auric Inc., Laser Diode Inc.

Consulting on photonic device design, fabrication, mounting, characterization, and assembly. Projects included analyzing the design of epitaxial layer structures in GaAs and InP-based materials for photonic devices, process development in all areas of wafer fabrication, the development of die attach and wire bonding procedures, and establishing an infrastructure and procedures for device testing. Provided technical consulting on a programs to develop high-speed data links (1.2 and 2.4 Gb/s) using silicon optical bench technology, high power laser diodes for optical pumping of Nd:YAG, and the fabrication of VCSELs via III-V oxidation. Support areas include device and facet coating design, epitaxial material design and qualification, vendor selection and processing support, device testing, hybrid assembly and characterization, and examining optical systems issues. Also provided support on processing infrastructure issues such as cleanroom and facility installation. Led teams involved in repairing and rebuilding processing tools. Created training materials and conducted operator training sessions. Taught short course on photonic devices.

❖ Developed improved process for fabricating 808 and 795 nm high-power pump lasers for diode-pumped solid-state laser applications.

❖ Developed single mode lasers for a DARPA program targeting single-mode optical communication systems using externally-modulated edge-emitting lasers operating at data rates in excess of 1 Gbps.

1990 – 1994 Amoco Research Center, Naperville, IL

Project Manager, Research Engineer: Conducted research on III-V oxidation and impurity-induced layer disordering (IILD); developed manufacturing processes for optoelectronic device fabrication; served as the project manager and technical lead for the development of high-power, high-reliability laser diodes for optical fiber amplifier deployment; served as the project manager and technical lead for the development of low-threshold, high optical-beam-quality laser diodes for optical communications; had direct supervisory responsibility for scientists, engineers, and technicians. Served as staff mentor in Amoco summer intern program.

❖ Developed systems for performing III-V oxidation and impurity-induced layer disordering capable of supporting volume production (multiple wafer capacity).

❖ Developed high power (>2.0 W) lasers using III-V oxidation.

❖ Developed index-guide single-mode lasers for optical communications applications using both IILD and III-V oxidation.

1983 – 1990 University of Illinois, Urbana, IL

Graduate Research Assistant (Ph.D. Advisor: Professor Nick Holonyak, Jr.): Co-invented a new process for fabricating semiconductor devices: “Oxidation of Al-bearing III-V materials.” This process has had a significant impact on the commercial success of VCSELs. First to apply impurity-

induce layer disordering (IILD) to InAlGaP lasers operating at 640 nm, which has become a key process in the fabrication of high peak-power lasers for DVD players (window formation). Specialized in photonic devices, especially semiconductor lasers. Conducted research in the areas of III-V oxidation, reliability of AlGaAs, IILD of III-V heterointerfaces, hydrogenation of III-V materials, and in the application of advanced processing technologies to the fabrication of high-performance optoelectronic devices. Fabricated and characterized semiconductor lasers and light-emitting devices in the $\text{In}_y(\text{Al}_x\text{Ga}_{1-x})_{1-y}\text{P}$, $\text{Al}_x\text{Ga}_{1-x}\text{As}$, and $\text{Al}_x\text{Ga}_{1-x}\text{As-In}_y\text{Ga}_{1-y}\text{As}$ material systems. Gained extensive experience in III-V materials analysis and device design, processing, and characterization. Academic emphasis on semiconductor devices and electromagnetics.

- ❖ Co-inventor of III-V oxidation process.
- ❖ Demonstrated visible spectrum lasers in the InAlGaP material system.

Undergraduate and Graduate Research Assistant (Advisor: Professor William J. Hunsinger), **Process Engineering Consultant** (Electronic Decision Incorporated): Developed and improved processes for the fabrication of acoustic charge-transport devices, including the development of processes for masking high-energy proton implants. Studied proton and deuteron isolation in GaAs through SIMS and C-V profiling.

Special Abilities

Strong leadership skills. Experience in writing proposals for government-funded research. Experience in leading R&D teams involved in both government-sponsored R&D and commercial product development. Experience in developing photonic integrated circuits and photonic devices, including solar cells. Experience in generating business and manufacturing strategies and in the formation of strategic alliances. Experience in evaluating markets and competition in photonics. Experience in writing and refining business plans and in making presentations to potential investors. Experience in project and program management. Experience in IEEE standards development, especially in the IEEE 802.3 standard (Ethernet). Experience with transceiver design and test for 10 Gigabit Ethernet systems. Experience with the design and fitting of facilities for optoelectronic device manufacturing. Experience in the design and characterization of laser diodes and other optoelectronic components used in data communications. Experience in general semiconductor fabrication techniques with a special emphasis on advanced processing techniques for the fabrication of photonic devices. Experience in the characterization of semiconductor materials. Familiarity with statistical process control and design of experiments.

Recognition

Honors and Awards:

IEEE Fellow, OSA Fellow, Dean's Award for Excellence in Research (UIUC College of Engineering, 2016), Spring 2015 List of Teachers Ranked as Excellent, Finalist in 2013 Innovation Celebration Innovation Transfer Award (University of Illinois/Champaign County Economic Development Board), University of Illinois Highest Honors, Department of Electrical and Computer Engineering Jordan Award, Department of Electrical and Computer Engineering ALCOA Award, Mortar Board, Sachem, Tau Beta Pi, Eta Kappa Nu, Sigma Xi (former member).

Affiliations and Activities:

IEEE (Fellow), OSA (Fellow), APS (Member)

Education

Ph.D., University of Illinois-Urbana, 1991
Major Field: Electrical Engineering; GPA: 4.93 (5.0 scale)

M.S., University of Illinois-Urbana, 1987
Major Field: Electrical Engineering; GPA: 5.00

B.S., University of Illinois-Urbana, 1985
Major Field: Electrical Engineering; GPA: 4.78

Personal

U. S. Citizen
Married (Kathy), three children (Lauren, Brian, and Eric)

Awarded Patents, Patent Applications, and Publications

Awarded Patents:

<u>PAT. NO.</u>	<u>Title</u>
45 10,381,803	Mode control in vertical-cavity surface-emitting lasers
44 10,373,939	Hybrid integrated optical device
43 10,209,448	Systems and methods for photonic polarization rotators
42 9,923,105	Processing of a direct-bandgap chip after bonding to a silicon photonic device
41 9,882,073	Structures for bonding a direct-bandgap chip to a silicon photonic device
40 9,742,154	Mode control in vertical-cavity surface-emitting lasers
39 9,709,735	Method and system for heterogeneous substrate bonding for photonic integration
38 9,659,993	Vertical integration of CMOS electronics with photonic devices
37 9,496,431	Coplanar integration of a direct-bandgap chip into a silicon photonic device
36 9,461,026	Method and system for template assisted wafer bonding
35 9,453,965	Systems and methods for photonic polarization rotators
34 9,356,162	High efficiency group III-V compound semiconductor solar cell with oxidized window layer
33 9,316,785	Integration of an unprocessed, direct-bandgap chip into a silicon photonic device
32 9,190,400	Method and system for heterogeneous substrate bonding for photonic integration
31 9,170,373	Systems and methods for photonic polarization-separating apparatuses for optical network applications
30 9,091,813	Systems and methods for photonic polarization beam splitters
29 8,948,226	Semiconductor device and method for producing light and laser emission
28 8,867,578	Method and system for hybrid integration of a tunable laser for a cable TV transmitter
27 8,859,394	Vertical integration of CMOS electronics with photonic devices
26 8,722,464	Method and system for template assisted wafer bonding
25 8,718,484	Laser optical transmission system with dual modulation
24 8,630,326	Method and system of heterogeneous substrate bonding for photonic integration
23 8,615,025	Method and system for hybrid integration of a tunable laser
22 8,611,388	Method and system for heterogeneous substrate bonding of waveguide receivers
21 8,605,766	Method and system for hybrid integration of a tunable laser and a mach zehnder modulator
20 8,559,470	Method and system for hybrid integration of a tunable laser and a phase modulator
19 8,445,326	Method and system for template assisted wafer bonding

18	8,368,995	Method and system for hybrid integration of an opto-electronic integrated circuit
17	8,222,084	Method and system for template assisted wafer bonding
16	7,959,363	Optical transceiver with optical multiplexer on a flexible substrate
15	7,941,053	Optical transceiver for 40 gigabit/second transmission
14	7,583,900	Modular optical transceiver
13	7,578,624	Flexible substrate for routing fibers in an optical transceiver
12	7,465,105	Flexible substrate for routing fibers in an optical transceiver
11	7,463,830	Modular optical transmitter for WDM transceivers
10	7,380,993	Optical transceiver for 100 gigabit/second transmission
9	7,359,642	Modular optical receiver
8	7,359,641	Modular optical transceiver
7	7,325,983	10GBASE-LX4 optical transceiver in XFP package
6	7,242,824	Flexible substrate for routing fibers in an optical transceiver
5	6,974,260	Flexible substrate for routing fibers in an optical transceiver
4	5,696,023	Method for making aluminum gallium arsenide semiconductor device with native oxide layer
3	5,567,980	Native oxide of an aluminum-bearing group III-V semiconductor
2	5,373,522	Semiconductor devices with native aluminum oxide regions
1	5,262,360	AlGaAs native oxide

Patent Applications:

	<u>PUB. APP. NO.</u>	<u>Title</u>
48	20190267773	QUANTUM IMPEDANCE MATCHING FOR CARRIER INJECTION IN TUNABLE TRANSISTOR-INJECTED QUANTUM CASCADE LASERS
47	20190145889	Integrated Spectroscopic Analysis System with Low Vertical Height for Measuring Liquid or Solid Assays
46	20180308834	MULTILEVEL TEMPLATE ASSISTED WAFER BONDING
45	20180052283	METHOD AND SYSTEM FOR HETEROGENOUS SUBSTRATE BONDING FOR PHOTONIC INTEGRATION
44	20180041010	Mode Control in Vertical-Cavity Surface-Emitting Lasers
43	20170108649	SYSTEMS AND METHODS FOR PHOTONIC POLARIZATION ROTATORS
42	20160274319	INTEGRATION OF UNPROCESSED, DIRECT-BANDGAP CHIP INTO A SILICON PHOTONIC DEVICE
41	20160202415	METHOD AND SYSTEM FOR HETEROGENOUS SUBSTRATE BONDING FOR PHOTONIC INTEGRATION
40	20160134083	Mode Control in Vertical-Cavity Surface-Emitting Lasers
39	20150139256	METHOD AND SYSTEM FOR HYBRID INTEGRATION OF A TUNABLE LASER
38	20150123157	VERTICAL INTEGRATION OF CMOS ELECTRONICS WITH PHOTONIC DEVICES
37	20150099318	PROCESSING OF A DIRECT-BANDGAP CHIP AFTER BONDING TO A SILICON PHOTONIC DEVICE

36	20150098676	INTEGRATION OF AN UNPROCESSED, DIRECT-BANDGAP CHIP INTO A SILICON PHOTONIC DEVICE
35	20150097211	STRUCTURES FOR BONDING A DIRECT-BANDGAP CHIP TO A SILICON PHOTONIC DEVICE
34	20150097210	COPLANAR INTEGRATION OF A DIRECT-BANDGAP CHIP INTO A SILICON PHOTONIC DEVICE
33	20140342500	METHOD AND SYSTEM FOR TEMPLATE ASSISTED WAFER BONDING
32	20140179036	METHOD AND SYSTEM FOR HETEROGENEOUS SUBSTRATE BONDING FOR PHOTONIC INTEGRATION
31	20140050241	Semiconductor Device and Method for Producing Light and Laser Emission
30	20130302920	METHOD AND SYSTEM FOR TEMPLATE ASSISTED WAFER BONDING
29	20130210214	VERTICAL INTEGRATION OF CMOS ELECTRONICS WITH PHOTONIC DEVICES
28	20130142476	SYSTEMS AND METHODS FOR PHOTONIC POLARIZATION-SEPARATING APPARATUSES FOR OPTICAL NETWORK APPLICATIONS
27	20130142475	SYSTEMS AND METHODS FOR POLARIZATION ROTATORS
26	20130142474	SYSTEMS AND METHODS FOR PHOTONIC POLARIZATION BEAM SPLITTERS
25	20120264256	METHOD AND SYSTEM FOR TEMPLATE ASSISTED WAFER BONDING
24	20120227798	HIGH EFFICIENCY GROUP III-V COMPOUND SEMICONDUCTOR SOLAR CELL WITH OXIDIZED WINDOW LAYER
23	20120149148	METHOD AND SYSTEM FOR TEMPLATE ASSISTED WAFER BONDING
22	20120057816	METHOD AND SYSTEM FOR HETEROGENOUS SUBSTRATE BONDING OF WAVEGUIDE RECEIVERS
21	20120057610	METHOD AND SYSTEM FOR HYBRID INTEGRATION OF A TUNABLE LASER AND A PHASE MODULATOR
20	20120057609	METHOD AND SYSTEM FOR HYBRID INTEGRATION OF A TUNABLE LASER A MACH ZEHNDER MODULATOR
19	20120057079	METHOD AND SYSTEM FOR HYBRID INTEGRATION OF A TUNABLE LASER FOR A CATV TRANSMITTER
18	20110267676	METHOD AND SYSTEM FOR HYBRID INTEGRATION OF AN OPTO-ELECTRONIC INTEGRATED CIRCUIT
17	20110085577	METHOD AND SYSTEM OF HETEROGENEOUS SUBSTRATE BONDING FOR PHOTONIC INTEGRATION
16	20110085572	METHOD AND SYSTEM FOR HYBRID INTEGRATION OF A TUNABLE LASER
15	20100186822	HIGH EFFICIENCY GROUP III-V COMPOUND SEMICONDUCTOR SOLAR CELL WITH OXIDIZED WINDOW LAYER
14	20090232503	OPTICAL TRANSCEIVER WITH OPTICAL MULTIPLEXER ON A FLEXIBLE SUBSTRATE
13	20090110408	Laser Optical Transmission System with Dual Modulation
12	20080187316	MODULAR OPTICAL TRANSCEIVER
11	20080095541	OPTICAL TRANSCEIVER FOR 40 GIGABIT/SECOND TRANSMISSION
10	20080069570	Optical transceiver for 100 Gigabit/second transmission

9	20080050074	10GBASE-LX4 OPTICAL TRANSCEIVER IN XFP PACKAGE
8	20080037995	Flexible substrate for routing fibers in an optical transceiver
7	20070047963	Optical transceiver having parallel electronic dispersion compensation channels
6	20070019964	Modular optical transmitter for WDM transceivers
7	20070003193	Flexible substrate for routing fibers in an optical transceiver
4	20060056776	Flexible substrate for routing fibers in an optical transceiver
3	20050105907	Modular optical receiver
2	20050084269	Modular optical transceiver
1	20050036746	Flexible substrate for routing fibers in an optical transceiver

Publications:

47 "Epitaxial Bonding and Transfer Processes for Large-Scale Heterogeneously Integrated Electronic-Photonic Circuitry," John Carlson, Coleman Williams, Maanav Ganjoo, and John Dallesasse, *J. Electrochem. Soc.* **166**, D3158 (2019).

46 "Effective bond-orbital model of III-nitride wurtzite structures based on modified interaction parameters of zinc-blende structures," F.-C. Hsiao, C.-T. Liang, Y.-C. Chang, and J.M. Dallesasse, *Computer Physics Communications* (2020) 107139, <https://doi.org/10.1016/j.cpc.2020.107139>.

45 "Wafer-Scale Method of Controlling Impurity-Induced Disorder for Optical Mode Engineering in High-Performance VCSELs," P. Su, F.-C. Hsiao, T. O'Brien, J.M. Dallesasse, invited paper, *IEEE Trans. Semi. Mfg.* **31**, 447 (2018). DOI: 10.1109/TSM.2018.2866065.

44 "Control of radiative base recombination in the quantum cascade light-emitting transistor using quantum state overlap," K. Chen, F.-C. Hsiao, B. Joy, and J.M. Dallesasse, *Appl. Phys. B*, 124:129, 2018, <https://doi.org/10.1007/s00340-018-6985-y>.

43 "Progress on the transistor-injected quantum-cascade laser", John M. Dallesasse, Kanuo Chen, Fu-Chen Hsiao, *Proc. SPIE 10540, Quantum Sensing and Nano Electronics and Photonics XV*, 105401P (26 January 2018); doi: 10.1117/12.2282476; <https://doi.org/10.1117/12.2282476>.

42 "Modeling of the electrically-tunable transistor-injected quantum cascade laser," Z. Lin, K. Chen, F.-C. Hsiao, Z. Wang, J.M. Dallesasse, and J.-P. Leburton, *J. Appl. Phys.* **122**, 235701 (2017).

41 "Integrated spectroscopic analysis system with low vertical height for measuring liquid or solid assays," Y. Wan, J. A. Carlson, S. A. Al-Mulla, W. Peng, K. D. Long, B. A. Kesler, P. Su, J. M. Dallesasse, B. T. Cunningham, *Sensors and Actuators B: Chemical* **255**, 935-943, 2018. doi.org/10.1016/j.snb.2017.08.126.

40 "Red and Near-Infrared III-Nitride Quantum Dot Lasers," A. Hazari, T. Frost, G.-L. Su, J.M. Dallesasse, and P. Bhattacharya, *IEEE J. of Sel. Top. Quant.* **23**, 1901409 (2017).

39 "1.3 μm Optical Interconnect on Silicon: A Monolithic III-Nitride Nanowire Photonic Integrated Circuit," Arnab Hazari, Fu-Chen Hsiao, Lifan Yan, Junseok Heo, Joanna M. Millunchick, John M. Dallesasse, and Pallab Bhattacharya, *IEEE J. Quantum Electron.* **53**, 6300109 (2017).

38 "Mode Behavior of VCSELs with Impurity-Induced Disorder," T. O'Brien, Jr., B. Kesler, S. Al Mulla, and J.M. Dallesasse, *IEEE Photon. Tech. Lett.* **29**, 1179-1182 (2017), DOI: 10.1109/LPT.2017.2701647.

- 37 "Compact characterization of liquid absorption and emission spectra using linear variable filters integrated with a CMOS imaging camera," Y. Wan, J.A. Carlson, B.A. Kesler, W. Peng, P. Su, S.A. Al-Mulla, S.J. Lim, A.M. Smith, J.M. Dallesasse, and B.T. Cunningham, *Nature Scientific Reports* **6**, 29117, 1-9, (2016). DOI: 10.1038/srep29117.
- 36 "Facilitating Single-Transverse-Mode Lasing in VCSELs via Patterned Dielectric Anti-Phase Filters," B. Kesler, T. O'Brien, G.-L. Su, and J.M. Dallesasse, *IEEE Photon. Tech. Lett.* **28**, 1497-1500 (2016).
- 35 "Electronic-Photonic Integration Using the Light-Emitting Transistor," P.-L. Lam, J.M. Dallesasse, G. Walter, and N. Holonyak, Jr., in preparation.
- 34 "Physical model for high indium content InGa_N/Ga_N self-assembled quantum dot ridge-waveguide lasers emitting at red wavelengths ($\lambda \sim 630$ nm)," G.L. Su, T. Frost, P. Bhattacharya, and J.M. Dallesasse, *Optics Express* **23**, 12850-12865 (2015).
- 33 "Detailed model for the In_{0.18}Ga_{0.82}N/GaN self-assembled quantum dot active material for $\lambda = 420$ nm emission," G.L. Su, T. Frost, P. Bhattacharya, J.M. Dallesasse, and S.L. Chuang, *Optics Express* **22**, 22716-22729 (2014).
- 32 "Effect of the energy barrier in the base of the transistor laser on the recombination lifetime," R. Bambery, C. Wang, J.M. Dallesasse, M. Feng, and N. Holonyak, Jr., *Appl. Phys. Lett.* **104**, 081117-081117-4 (2014).
- 31 "Integrated tunable CMOS laser," T. Creazzo, E. Marchena, S.B. Krasulick, P.K.L Yu, D. Van Orden, J.Y. Spann, C.C. Bliven, L. He, J.M. Dallesasse, R.J. Stone, and A. Mizrahi, *Optics Express* **21**, 28048-28053 (2013).
- 30 "III-V Oxidation: Discoveries and Applications in Vertical-Cavity Surface-Emitting Lasers," J.M. Dallesasse and D.G. Deppe, *Proc. IEEE* **101**, 2234-2242 (2013).
- 29 "Voltage and Current Modulated 20 Gbit/s Operation of a Transistor Laser at Room Temperature," R. Bambery, F. Tan, M. Feng, J.M. Dallesasse, and N. Holonyak, Jr. *IEEE Photon. Tech. Lett.* **25**, 859-862 (2013).
- 28 "Oxidation of Al-bearing III-V materials: A review of key progress," J. M. Dallesasse and N. Holonyak, Jr., *Applied Physics Reviews*, *J. Appl. Phys.* **113**, 051101-051101-11 (2013).
- 27 "Light Emission from an AlGaAs Single-Quantum-Well Heterostructure by Electron Excitation from a Micromachined Field Emitter Source," H. Busta, J. Dallesasse, S. Smith, J. Pogemiller, B. Zimmerman, and R. Mathius, *J. Micromech. Microeng.* **4**, 55-59 (1994).
- 26 "Multiple Wavelength Operation of a Laser-Diode Array Coupled to an External Cavity," G. C. Papen, G. M. Murphy, D. J. Brady, A. T. Howe, J. M. Dallesasse, R. Y. Dejule, and D. J. Holmgren, *Optics Letters* **18**, 1441-1443 (1 September 1993).
- 25 "Properties and Use of In_{0.5}(Al_xGa_{1-x})_{0.5}P and Al_xGa_{1-x}As Native Oxides in Heterostructure Lasers," F. A. Kish, S. J. Caracci, N. Holonyak, Jr., K. C. Hsieh, J. E. Baker, S. A. Maranowski, A. R. Sugg, J. M. Dallesasse, R. M. Fletcher, C. P. Kuo, T. D. Osentowski, and M. G. Craford, *J. Electron. Mater.* **21**, 1133-1139 (December 1992).
- 24 "Native-Oxide Defined In_{0.5}(Al_xGa_{1-x})_{0.5}P Quantum Well Heterostructure Window Lasers (660 nm)," S. A. Maranowski, F. A. Kish, S. J. Caracci, N. Holonyak, Jr., J. M. Dallesasse, D. P. Bour, and D. W. Treat, *Appl. Phys. Lett.* **61**, 1688-1690 (5 October 1992).
- 23 "Resonance and Switching in a Native-Oxide-Defined Al_xGa_{1-x}As-GaAs Quantum Well Heterostructure Laser Array," N. El-Zein, N. Holonyak, Jr., F. A. Kish, J. M. Dallesasse, and R. D. Burnham, *Appl. Phys. Lett.* **61**, 705-707 (10 August 1992).

- 22 "Dependence on Doping Type (p/n) of the Water Vapor Oxidation of High-Gap $\text{Al}_x\text{Ga}_{1-x}\text{As}$," F. A. Kish, S. A. Maranowski, G. E. Höfler, N. Holonyak, Jr., S. J. Caracci, J. M. Dallesasse, and K. C. Hsieh, *Appl. Phys. Lett.* **60**, 3165-3167 (22 June 1992).
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- 39 IEEE Student Professional Awareness Conference, Invited Panelist, February 7th, 2015.
- 38 "Electronic-Photonic Integration Using the Light-Emitting Transistor," J.M. Dallesasse, P.L. Lam, and G. Walter, Invited Talk, Latin American Optics & Photonics Conference, Nov. 16-21, 2014.
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- 20 "The Discovery and Device Applications of III-V Oxidation," J. M. Dallesasse, Invited Talk and Paper, LED 50th Anniversary Symposium, Urbana, IL, October 24-25, 2012.
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- 18 "III-V Oxidation and Optical Networking: The Discovery of III-V Oxidation, It's Application, and Future Process Technologies for Photonic Integration," J. Dallesasse, University of Notre Dame Graduate Seminar, March 25, 2011.
- 17 "Oxidation Then and Now: The Discovery of III-V Oxidation and Its Commercial Use Today," J. Dallesasse, The Holonyak Symposium, Urbana, IL, October 2008.
- 16 "100 Gigabit Ethernet: Limitations for Practical Deployments," J. Dallesasse, OIDA Panel Discussion, OFC 2007.
- 15 "Technologies for 100 Gigabit Ethernet: Components and Modules for the Physical Layer," OIDA 16th Annual Forum, August 2006.
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Service and Committees:

IEEE LEOS Chicago Chapter, Treasurer, 1992-1994.

LED 50th Anniversary Symposium, Session Chair, Laser 2B: The Transistor Laser and LEDs, October 24-25, 2012.

Steering Committee, “IEEE Transactions on Semiconductor Manufacturing,” (Jan. 2013 – present), Chair (Jul 2017 – present).

IEEE Electron Devices Society Optoelectronic Devices Technical Committee (Member 2015-2018, Chair 2018-Present).

Steering Committee, “IEEE Journal of Lightwave Technology,” (Apr. 2015 – Present).

Associate Editor, “Journal of Quantum Electronics,” (Apr. 2014 – Present).

Organized IEEE Journal of Quantum Electronics Focus Issue on Silicon Photonics, November 2015.

Organizing Committee, Center for Nanoscale Science and Technology 2013 Nanotechnology Workshop, May 2-3, 2013.

Reviewer: National Science Foundation Panel Reviews; 2003 SBIR/STTR Phase I, 2005 SBIR/STTR Phase I, 2006 SBIR/STTR Phase II, ECCS (2013 Device Panel, 2013 Mail Review, 2013 Photonics Panel, 2016 Photonic Integration and Telecom Panel, 2017 E2CDA Panel, 2018 E2CDA Panel, 2020 EPMD Panel), CMMI/ECCS (2014 Scalable Nanomanufacturing Panel), 2016 EFRI-ACQUIRE, and SBIR (2015 Lasers and Optical Components), 2019 NSF QII-TAQS (Enabling Quantum Leap: Quantum Idea Incubator for Transformational Advances in Quantum Systems), Pre-Proposal Review.

Reviewer: UGent Industrial Research Fund 2016; Science Foundation Ireland Future Leaders Program, Oct. 2016; Singapore National Research Foundation Competitive Research Programme, Mar. 2017.

Reviewer: IEEE Transactions on Components, Packaging, and Manufacturing Technology; IEEE Journal of Quantum Electronics; Electronics Letters; Journal of Applied Physics; IEEE Transactions on Electron Devices; Journal of Electronic Materials; IEEE Photonics Technology Letters; IEEE Journal of Lightwave Technology; Optics Express, IEEE Sensors Conference 2017.

Technical Program Committee: EDSSC 2017, EDSSC 2016.

Reviewer: Andrew T. Yang Research Award (UIUC).

Fellow Evaluator: IEEE Electron Devices Society.

NSF ECCS Workshop on Broader Impacts (Participant and Scribe), May 12-13, 2016.

UIUC ECE/MNTL Committees: Curriculum Committee, Graduate Admissions Committee, Colloquium Committee, Fellowship Committee (Member & Chair), Development and Alumni Relations Committee (Chair), MNTL Space Committee, MNTL Lithography Engineer Search Committee, MNTL Research Engineer / Associate Director Search Committee, MNTL MOCVD Research Engineer Search Committee, MNTL Principal Engineer Search Committee, MNTL Visiting Research Scientist Search Committee, MNTL Director of Facilities Search Committee (Chair).

ECE Alumni Board Faculty Liaison

Faculty Senator: Urbana-Champaign Senate, 2014 – 2016, 2017 – present.

UIUC Senate Executive Committee, 2018 - present.

University Senates Conference (UI System), 2018 - present.

UC Senate Campus Operations Committee, 2014 – 2017 (member), 2017 – present (chair).

UIUC Campus Parking Appeals Board (2017 - present).

2016 Chicago and Milwaukee Section IEEE Fellows Gala Committee.

Session Chair, 2018 Photonics West, Quantum Sensing and Nano Electronics and Photonics XV, Session 12: Quantum Cascade Lasers II.

Courses Taught:

ECE488: “Compound Semiconductors and Devices”

ECE340: “Semiconductor Devices”

ECE536: “Integrated Optics and Optoelectronics”

Grants and Contracts:

Transverse Mode Control for High-Performance Vertical-Cavity Surface-Emitting Lasers, Lead PI, II-VI Foundation Grant, 7/1/19 – 6/30/20, \$95,000

CC* Integration: SENSELET: Sensory Integration Infrastructure for Scientific Laboratory Environments, co-PI, National Science Foundation, 8/16/18 – 8/15/20, \$499,996

Transverse Mode Control for High-Performance Vertical-Cavity Surface-Emitting Lasers, Lead PI, II-VI Foundation Grant, 7/1/18 – 6/30/19, \$95,000

A Fever Diagnostic Panel Using Multiplexed Smartphone Spectroscopy and a Simplified Platform for Rapid Sandwich Immunoassays, National Institutes of Health, co-PI, 7/1/18 – 6/30/19, \$393,107

CC* Integration: BRACELET: Robust Cloudlet Infrastructure for Scientific Instruments, co-PI, National Science Foundation, co-PI, 3/1/17 – 2/28/19, \$500,000

E2CDA: Type I: Collaborative Research: Electronic-Photonic Integration Using the Transistor Laser for Energy-Efficient Computing, National Science Foundation and Semiconductor Research Corporation, Lead PI (2 universities, 6 PIs), 10/1/16 – 9/30/19, \$2,573,904

CEMRI for Photonics and Multiscale Nanomaterials, Lead PI, University of Michigan and National Science Foundation, 9/1/16 – 8/31/17, \$35,000

EAGER: Lab-in-a-Smartphone, co-PI, National Science Foundation, 9/1/14 – 8/31/16, \$300,000

The Transistor-Injected Quantum Cascade Laser, An Improved Coherent Mid-IR Source, Lead PI, National Science Foundation, 5/1/14 – 4/30/17, \$400,000

GaN-Based Quantum-Well and Quantum-Dot LEDs, Lead PI, University of Michigan and National Science Foundation, 9/1/11 – 8/31/17, \$175,000

Low Cost Raman Instrument for Point of Use Applications, Center for Innovative Instrumentation Technology, co-PI, \$50,000

Short External Cavity Laser for EAMR Head: Research on High Power Single-Mode VCSELs, Lead PI, Western Digital, 8/30/10 – 12/31/14, \$125,000

Research Gifts:

Research Gift from Northrop Grumman, \$225,000

Research Gift from MRT, \$25,000

Research Funding Gift from QEOS, "For Advancement of Transistor Laser Technology", Quantum Electro Opto Systems, \$50,000

Expert Witness:

Expert Witness, Sumitomo Electric Device Innovations USA, Dickstein Shapiro LLC, January 2013-April 2013 (background work, did not testify)

Expert Witness, Acteon Group, Workman Nydegger, February 2014-March 2014 (background work, did not testify)

Expert Witness, Avago Technologies, Foley & Larder LLP, July 2015-December 2015, United States District Court, Northern District of California, San Jose Division, Case No. 5:10-CV-02863-EJD (PSG), provided expert reports and testimony by deposition

Expert Witness, Philips Lighting, Finnegan, Henderson, Garrett & Dunner LLP, December 2015-March 2016 (background work, did not testify)

Expert Witness, May 2017-December 2018, Confidential Consulting Matter and Client, Latham & Watkins (background work and declaration report)

Expert Witness, August 2017-2018, Oyster Optics LLC, Russ, August, & Kabat, United States District Court, Eastern District of Texas, Marshall Division, Case No. 2:16-cv-01302-JRG-RSP, 2:16-cv-01297-JRG-RSP, and 2:16-cv-01301-JRG-RSP, provided expert reports and testimony by deposition

Expert Witness, September 2018-Present, Confidential Consulting Matter and Client

Ph.D. Students Graduated:

Rohan Bamberg, 2014, "Development of Transistor Lasers for High-Speed Short-Haul Transmission Links," (now at Intel Corporation, co-advised with Milton Feng)

Guan-Lin Su, 2017, "Modeling of devices for gallium-nitride-based integrated photonics," (now a Postdoctoral Researcher at UC Berkeley)

Ben Kesler, 2017, "Mode control in VCSELs using patterned dielectric anti-phase filters," (now at Lumentum)

Tommy O'Brien, 2017, "High-Power Single-Mode Vertical-Cavity Surface-Emitting Lasers via Impurity Induced Disorder" (now at Intel Corporation)

Kanuo Chen, 2017, "The Transistor-Injected Quantum-Cascade Laser," (now at Apple)

M.S. Students Graduated:

Poh-Lian Lam, Spring 2014, "Monolithic Electronic-Photonic Integration of the Light-Emitting Transistor," now at Quantum Electro-Optic Systems, Malaysia

John Carlson, Spring 2017, "Scalable Designs and Methods for Heterogeneous Electronic-Photonic Circuitry," now at UIUC pursuing Ph.D. (Dallesasse Group) (Continuing for Ph.D.)

Saoud Al-Mulla, Summer 2017, "Absorption and fluorescence spectroscopic analysis using compact, linear variable filter based, detection platforms," (now at Intel Corporation)

Current M.S./Ph.D. Students:

Fu-Chen (Alex) Hsiao, John Carlson, Patrick Su, Robert Kaufman, Kevin Pikul, Maanav Ganjoo

Undergraduate Research Projects:

Aiyin Liu

Neil Sarwal

Benjamin Chng

Alan Selewa

Narae Yoon

Brittany Joy

Patrick Su (Current Graduate Student in Dallesasse's Group)

Saoud Al-Mulla (Completed M.S. in Dallesasse's Group)

Shuang Chen

Coleman Williams

Maanav Ganjoo

Kevin Pikul

Elise Perry

Undergraduate Thesis Projects:

Patrick Su

Saoud Al-Mulla

Le Yi

Maanav Ganjoo

Coleman Williams