**CURRICULUM VITAE: Larry A. Coldren**

**Current Position**

Fred Kavli Professor of Optoelectronics and Sensors

Electrical & Computer Engineering and Materials Departments

University of California, Santa Barbara, CA 93106

Tel (805) 893-4486; Fax (805) 893-4500; Email: coldren@ece.ucsb.edu

**Formal Education**

BS, Electrical Engineering; Bucknell University, 1968

BA, Physics; Bucknell University, 1968

MS, Electrical Engineering; Stanford University, 1969

PhD, Electrical Engineering; Stanford University, 1972

**Professional Experience**

2009 - 2011: Acting Dean, College of Engineering, UCSB

1986 - present: Professor, Dept. of Materials, UCSB

1984 - present: Professor, Dept. of Electrical and Computer Engineering, UCSB

1998 - 2005: Chairman and Chief Scientist (part time), Agility Communications

1990 - present: Director, Optoelectronics Technology Center

1968 -1984: AT&T Bell Laboratories, Research Division

**Honors and Awards:**

2017 OSA Nick Holonyak, Jr Award

2016 Elected to National Academy of Inventors

2015 IPRM Award

2014 IEEE David Sarnoff Award

2014 Plenary Speaker, Conference on Lasers and Electro-Optics (CLEO)

2011 Plenary Speaker, Asia Communications and Photonics Conference (ACP’11)

2010 Plenary Speaker, Microwave Photonics (MWP’10)

2009 Plenary Speaker, IPRM ‘09

2009 Aaron Kressel Award

2006 Plenary Speaker, IPRM ‘06

2004 Elected to the National Academy of Engineering

2004 John Tyndall Award

2004 Plenary Speaker and Honorary Chairman, CPT Symposium

2003 Original Member, ISI Highly cited Researchers Database

2002 Plenary Speaker, IEEE-LEOS Annual Meeting

2002 IEE Fellow

2000 Fred Kavli Professor of Optoelectronics and Sensors

1992 OSA Fellow

1981 IEEE Fellow

**Recent Major Research Contributions:**

* Over 20,000 citations to publications & Patents; H-index= 71
* Widely-tunable coherent receiver Photonic ICs & Optical-phase-locked loop analog-coherent receivers to 40 Gbs
* Development of large scale Photonic ICs on InP
* Demonstration and commercialization of widely-tunable SGDBR lasers & integrated laser-modulators
* Analysis, design, and monolithic fabrication techniques for multisection tunable diode lasers
* VCSELs with record efficiency and speed
* Vertical-Cavity Surface-Emitting Laser (VCSEL) designs with periodic gain & tapered dielectric aperturing

**PhDs graduated as primary advisor:** about 75

**Postdoctoral Scholars Supervised:** about 20

**Visiting Researchers Supervised:**  about 10

**Patents:** 63 issued, considering combined cases

**Patents Granted**

1. “Monolithic Surface Acoustic Wave Amplifier Device and Method of Manufacture,” US Patent # 3,877,982 (April 1975)

2./3. “Slot Waveguide with Tapered Edges,” and “Acoustic Surface Waveguide with Graded Profile Cross Section,”

US Patent # 3,831,115 (August 1974)

4. “Elastic Waveguide Utilizing an Enclosed Core Member,” US Patent # 3,922,622 (November 1975)

5. “Acoustoelectric Wave Semiconductor Signal Processing Apparatus with Storage of Weighting Factor,”

US Patent # 3,982,113 (September 1976)

6. “Acoustic Wave Devices,” US Patent # 4,117,424 (September 1978)

7. “Micropositioners using a crystal having moveable domain walls,” US Patent # 4,128,616 (December 1978)

8. “Surface Acoustic Wave Multistrip Coupler,” US Patent # 4,166,987 (September 1979)

9./10./11. “Surface Acoustic Wave Resonator Filters with Folded Acoustic Coupling,” “Temperature Stable - U - Path Filters,” and “Surface Wave Resonator Cascade,” US Patent # 4,327,340 (April 1982)

12. “SAW Resonator Filters with Improved Temperature Stability,” US Patent # 4,325,038 (April 1982)

13. “Reactive-Ion-Etching of III-V Semiconductor Compounds,” US Patent # 4,285,763 (August 1981)

14. “Reactive Sputter Etching Apparatus,” US Patent # 4,309,267 (January 1982)

15. “Semiconductor Laser with Conductive Current Mask,” US Patent # 4,445,218 (April 1984)

16. “Method of Preferentially Etching Optically Flat Mirror Facets in InGaAsP/InP Heterostructures,” US Patent # 4,354,898 (October 1982)

17, “Ohmic Contact to p- Type Group III-V Semiconductors,” US Patent # 4,471,005 (September 1984)

18./19. “Spectral Control Arrangement for Coupled Cavity Laser,” and “Orientation of InP Substrate Wafers,”

US Patent # 4,439,268 (March 1984)

20. “Spectral Control Arrangement for Coupled Cavity Laser (CIP),” US Patent # 4,608,697 (August 1986)

21. “Self-Stabilized Semiconductor Lasers,” US Patent # 4,622,672 (November 1986)

22. “Buried undercut mesa-like waveguide,” US Patent # 4,725,112 (February 1988)

23. “Buried undercut mesa-like waveguide and method of making same,” US Patent # 4,764,246 (August 1988)

24, “Low Damage-Producing, Anisotropic, Chemically Enhanced Etching Method and Apparatus,”

US Patent # 4,874,459 (October 1989)

25. “Multi-Section Tunable Laser with Differing Multi-Element Mirrors,” US Patent # 4,896,325 (January 1990)

26. “Surface-Emitting Lasers with Periodic Gain and A Parallel Driven NIPI Structure,” US Patent # 4,873,696

(October 1989)

27. “Electrical Pumping Scheme for Vertical-Cavity Surface-Emitting Lasers,” US Patent # 5,343,487 (August 1994)

28. “Method of Making a Vertical Cavity Laser,” US Patent # 5,877,038 (March 1999)

29. “Integrated Semiconductor Lasers and Photodetectors,” US Patent # 6,148,016 (November 2000)

30. “Direct-Coupled Multimode WDM Optical Data Links with Monolithically-Integrated Multiple-Channel VCSEL and Photodetector Arrays” US Patent # 6,195,485 (February 2001)

31. “Direct-Coupled Multimode WDM Optical Data Links with Monolithically-Integrated Multiple-Channel VCSEL and Photodetector Arrays” US Patent # 6,574,398 (June 2003)

32. “Increased Lateral Oxidation Rate of Aluminum Indium Arsenide” (with Eric Hall) US Patent # 6,472,695

(October 2003)

33. “Tapered Air Apertures for Thermally Robust Vertical Cavity Laser Structures,” US Patent # 6,714,572 (March 2004)

34. “Tunable Laser Cavity Sensor Chip,” US Patent # 6,767,515 (July 2004)

35. “Integrated Sensor” (with C. Meinhart and T. Stultz) US Patent # 6,899,849 (May 2005)

36. “Heat Spreading Layer for Vertical-Cavity Surface-Emitting Laser” (with Shigeru Nakagawa and Erik Hall)

US Patent # 6,810,064 (October 2004)

37. "Contact Scheme for Intracavity Contacted VCSEL" (with Eric Hall and Shigeru Nakagawa) US Patent # 6,714,573 (March 2004)

38. “Method of Fabricating a Distributed Bragg Reflector Having Enhanced Thermal and Electrical Properties” (with Guilhem Almuneau) US Patent # 6,631,154 (October 2003)

39. “Distributed Bragg Reflectors Incorporating SB Material for Long-Wavelengh Vertical Cavity Surface Emitting Lasers” (with Erik Hall and G. Almuneau) US Patent # 6,798,817 (September 2004)

40. “Double Intracavity Contacted Long-Wavelength VCSELs and Method of Fabricating Same” (with Eric Hall & Shigeru Nakagawa) US Patent # 6,653,158 (November 2003)

41. “Controller Calibration for Small Form Factor Sampled Grating Distributed Bragg Reflector Laser,”

US Patent # 7,061,943 (June 2006)

42. “Sampled Grating Distributed Bragg Reflector Laser Controller,” US Patent # 6,954,476 (October 2005)

43. “Mirror and Cavity Designs for Sampled Grating Distributed Bragg Reflector Lasers,” US Patent # 6,590,924 (July 2003)

44. “High-Power, Manufacturable Sampled-Grating Distributed Bragg Reflector Lasers,” US Patent # 6,909,734 (June 2005)

45. “Manufacturable Sampled Grating Mirrors,” US Patent # 6,937,638 (August 2005)

46. “Integrated Opto-Electronic Wavelength Converter Assembly” US Patent # 6,580,739 (June 2003)

47. “Method for Converting an Optical Wavelength Using a Monolithic Wavelength Converter Assembly”

US Patent # 6,349,106 (February 2002)

48. “Method for Making a Monolithic Wavelength Converter Assembly” US Patent # 6,624,000 (September 2003)

49. “Opto-Electronic Laser with Integrated Modulator” (with Gregory Fish) US Patent # 6,628,690 (September 2003)

50. “Method of Making an Opto-Electronic Laser with Integrated Modulator” (with Gregory Fish) US Patent # 6,574,259 (June 2003)

51. “Tunable Laser Source with Integrated Optical Amplifier” (with Thomas Mason & Gregory Fish) US Patent # 6,658,035 (December 2003)

52. “Method of Generating an Optical Signal with a Tunable Laser Source with Integrated Optical Amplifier” (with Thomas Mason & Gregory Fish) US Patent # 6,687,278 (February 2004)

53. “Method of Making a Tunable Laser Source with Integrated Optical Amplifier” (with Thomas Mason & Gregory Fish) US Patent # 6,654,400 (November 2003)

54. “Methods for Robust Channel Switching of Widely-Tunable SGDBR Lasers” (with Michael Larson and Torsten Wipiejewski) US Patent # 6,868,100 (February 2004)

55. “Method for Aperturing Vertical-Cavity Surface-Emitting Lasers (VCSELS),” US Patent # 6,841,407 (January 2005)

56. “Method of Modulating an Optical Wavelength with an Opto-Electronic Laser with Integrated Modulator” (with Gregory Fish) US Patent # 6,614,819 (September 2003)

57. “Double Intracavity Contacted Long-Wavelength VCSELs” (with Eric Hall & Shigeru Nakagawa) US Patent # 6,687,281 (February 2004)

58. “Tunable Laser Source with an Integrated Wavelength Monitor and Method of Operating the Same”

US Patent # 6,714,566 (March 2004)

59. “Traveling Wave Optoelectronic Wavelength Converter” [Series](with Christopher Coldren) US Patent # 7,133,576

(November 2006)

60. “Traveling-Wave Optoelectronic Wavelength Converter,” [parallel] (with Christopher Coldren) US Patent # 7,043,097 (May 2006)

61. “Traveling-/wave Optoelectronic Wavelength Converter,” [parallel-2] (with Christopher Coldren) US Patent # 7,174,058 (February 2007)

62. “Tunable Laser Source with Integrated Wavelength Monitor,” (with Thomas Mason & Gregory Fish)

Us Patent # 7,342,950 (March 2008)

63. “Tunable Laser Source with Integrated Optical Modulator,” (with Thomas Mason & Gregory Fish) Us Patent # 7,622,315

(November 2009)

64. “Manufacturable Sampled Grating Mirrors,” (with Gregory Fish) US Patent # 7,643,532 (January 2010)

65. “Small Dimension High-Efficiency High-Speed Vertical-Cavity-Surface-Emitting Lasers,” (with Yu-Chia Chang)

US Patent # 7,916,768 (March 2011)

See separate **Publications**