Professor Duncan L. MacFarlane, Ph.D., P.E.

The Bobby B. Lyle School of Engineering

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Professional Experience

The Bobby B. Lyle School of Engineering, Southern Methodist University

Bobby B. Lyle Centennial Chair in Engineering Entrepreneurship, 2015 – present

Professor of Electrical Engineering, 2015 – present

Professor, Department of Engineering Management, Information and Systems, 2016-present

Associate Dean for Engineering Entrepreneurship, 2015 – present

- Developed novel M.S. in Engineering Entrepreneurship degree program
- Moved Photonics Devices and Systems Laboratory to SMU. Raised more than $1.5Mn in new research funding. Incubating three products in the area of local access telecommunications.
- Collaborated with Development and key alumni donors to craft and launch a $26Mn funding initiative in Engineering Entrepreneurship.

Acting Executive Director of the Hart Center for Engineering Leadership 2015-2016

- Turnaround Assignment: Raised morale of staff; trimmed operating cost of center by 30%; increased use of information technology, industry mentors and MBA students to serve Lyle's graduate population, doubling the center's reach.

The Erik Jonsson School of Engineering and Computer Science, The University of Texas at Dallas

Professor of Electrical Engineering, 2001 – 2015

- Founder and Director, the Photonic Devices and Systems Laboratory (PDSL). $5.4 Million of competitive research funding over the last decade (DARPA, NIH, NSF, ONR, NRO, industry) to explore photonic integrated circuitry for communications and information processing, high bandwidth communications, and instrumentation, particularly for biomedical applications.
- Co-founder: MRRA Inc., a company dedicated to improving medical imaging through supporting instrumentation that was spun out from the PDSL.
- Incubating: Brain Brush, a company dedicated to imaging neurological activity at an unprecedented scale.
- Taught graduate and undergraduate courses (Electromagnetics, Communication Systems, Optics, among others) in Electrical Engineering, and graduate courses in Systems Engineering and Management, and in the School of Management. Upon request of our local industry partners I developed and currently teach a course, "The Management of High Tech Products," that is unique to UT Dallas. In 2014 I won the Jonsson School Award for Teaching Excellence. I have a YouTube channel under the name "Prof MacFarlane" where I have, among other lectures, posted the entirety of two of my courses: https://www.youtube.com/channel/UCdtmVJnRpT7Gcq37W1OQdMg/feed

- In 2012 I won the UT Dallas Diversity Ambassador Award for tutoring mathematics in south Dallas.

Associate Dean for Interdisciplinary Programs, 2003-2009

- Responsible for all interdisciplinary degree programs in the Jonsson School. Developed Joint MSEE/MBA program with School of Management.
- Started six degree programs in three new departments (Materials Science and Engineering, Bioengineering, Systems Engineering and Management) for the Erik Jonsson School of Engineering and Computer Science. The process included negotiations with the UT Board of Regents, the Texas Coordinating Board, UT Arlington and UT Southwest Medical School, and ABET/SACS for accreditation. Responsible for market assessment, defining initial strategies and hiring founding faculty.
- Prepared ABET accreditation reports and played leadership role in the site visits for Telecommunications Engineering and Electrical Engineering, 2009.

Program Head, Telecommunications Engineering, 2002-2003

- Leadership of a traditional academic program in an engineering school. Advocate for the Telecom Engineering faculty and students and representative of the university administration.
- Responsible for three degree programs with a total enrollment of approximately 200 students and 6 faculty members.
- Developed new budgetary and governance structure for this interdisciplinary program between EE and CS.

Associate Professor of Electrical Engineering, 1994-2001

- Incubated novel embedded Optical Spectrum Analyzer for DWDM fiber optic communication systems. Company sold to JDS-Uniphase.

Assistant Professor of Electrical Engineering, 1989-1994

- Incubated 4-D Display Corp, a volumetric display company.
- Invented GeoBrowser Web Browser for location based mobile advertising.
- Taught 11 new course preparations in five years.

Director, Product Management, (11/2000 – 1/2002) Celion Networks, Richardson, Texas. Senior Management position responsible for: Engineering design, product definition and system development, marketing and business development, strategy for Sequoia Capital (VC) backed start-up.

Product Line and Engineering Manager, (10/1999 – 11/2000) JDS Uniphase, Richardson, Texas. Drove engineering design, product development and manufacturing, marketing and business development, strategy for very high growth business unit. Took product from pre-revenue to a run rate of $100m/year in revenue in 12 months.

Consultant, Intellectual Property (1994-present) Providing strategic advice, monetization and valuation, and expert witness services in patents and patent portfolios on numerous engagements. Testified in deposition and Federal Court on multiple occasions.

Consultant (6/96--10/97) Texas Instruments, Dallas, Texas. Led and contributed to design and manufacture of digital mirror device (DMD) based optical displays and printers.

Senior Staff Scientist (7/85 - 9/86) W. J. Schafer Associates, Inc., Chelmsford, Massachusetts. Led and contributed to theoretical and empirical studies on the effects of high power optical radiation including laser damage and UV photochemistry. Gained practical high voltage engineering experience.

Education

Portland State University, Portland, Oregon, Ph.D. Electrical Engineering, June 1989. Dissertation Title: Ultrashort Pulse Production in Synchronously Pumped Mode-Locked Dye Laser Systems. Outstanding Doctoral Candidate Award, 1988 and 1989.

Brown University, Providence, Rhode Island, Sc.M. Electrical Engineering, June 1985. Thesis Title: Two Photon Dispersion: The Mode-Locking of an Nd:YAG Laser and Optical Hysteresis Using Rhodamine 6G.

Brown University, Providence, Rhode Island, Sc.B., Honors, Electrical Engineering, June 1984. (honors) Thesis Title: Raman Enhanced Absorption.

Southern Methodist University, Dallas, Texas, M.B.A., May, 1998. (graduated second in EMBA class).

Phillips Academy, Andover, Massachusetts, 1980.

Journal Papers

1. N. M. Lawandy, D. V. Plant and D. L. MacFarlane, "Optical bistability in a dissipative, thermally expanding etalon," IEEE Journal of Quantum Electronics QE-21, 108 (1985).
2. N. M. Lawandy, G. A. Koepf and D. L. MacFarlane, "Frequency pulling in far-infrared lasers that exhibit pressure shifts," Infrared Physics 25, 751 (1985).
3. N. M. Lawandy, D. L. MacFarlane, W. S. Rabinovich and D. Katayama, "Two-photon optical hysteresis at 1.06 microns in a nonlinear Fabry-Perot etalon containing rhodamine 6G : methanol solutions," Infrared Physics 25, 755 (1985).
4. N. M. Lawandy and D. L. MacFarlane, "Passive mode-locking of a Nd:YAG laser with a two-photon absorber," Applied Optics 24, 3126 (1985).
5. N. M. Lawandy and D. L. MacFarlane, "Strong passive mode-coupling of an Nd:YAG laser with the two-photon absorber rhodamine 6G," in Optical Instabilities, ed. by R. W. Boyd, M. G. Raymer and L. M. Narducci, p 284, Cambridge University Press, 1986.
6. D. L. MacFarlane and Lee W. Casperson, "Pulse train instabilities in a mode-locked argon laser," Journal of the Optical Society of America B 4, 1770 (1987).
7. D. L. MacFarlane, Lee W. Casperson and A. A. Tovar, "Spectral behavior and pulse train instabilities of a synchronously pumped mode-locked dye laser," Journal of the Optical Society of America B 5, 1144 (1988).
8. D. L. MacFarlane and Lee W. Casperson, "Pump pulse effects in synchronously pumped mode-locked dye lasers," Journal of the Optical Society of America B 6, 292 (1989).
9. D. L. MacFarlane and Lee W. Casperson, "Pump pulse effects in hybridly mode-locked dye lasers," Optics Letters 6, 314 (1989).
10. D. L. MacFarlane and Lee W. Casperson, "Theory of a synchronously pumped mode-locked dye laser in the short pump pulse limit," Journal of the Optical Society of America B 6, 1175 (1989).

11. D. L. MacFarlane, "On the design of synchronously pumped mode-locked dye lasers with improved noise characteristics," Photonics Technology Letters 1, 189 (1989).
12. D. L. MacFarlane, Lee W. Casperson and S. M. Janes, "Coherence effects in hybridly mode-locked dye lasers: Theory and experiment," IEEE Journal of Quantum Electronics 25, 2485 (1989).
13. Bahram Zandi, Lee W. Casperson and D. L. MacFarlane, "Effects of bandwidth limiting tuning elements in synchronously pumped mode-locked lasers," Journal of Applied Physics 67, 2229 (1990).
14. D. L. MacFarlane and Lee W. Casperson, "Pulse train instabilities of a synchronously pumped mode-locked dye laser: Experimental phase plots," Journal of the Optical Society of America B 7, 285 (1990).
15. D. L. MacFarlane, S. M. Janes, Lee W. Casperson and S. H. Jiang, "Timing and detuning studies in a hybridly mode-locked dye laser," IEEE Journal of Quantum Electronics 26, 718 (1990).
16. D. L. MacFarlane, "Pump considerations for gain switched diode lasers," Journal of Applied Physics 68, 3013 (1990).
17. D. L. MacFarlane and L. S. Tamil, "Pump power distribution in multistage optical amplifiers," Optics Communications 79, 77 (1990).
18. D. L. MacFarlane, "Instabilities of ultrashort pulse dye lasers," in Nonlinear Dynamics in Optical Systems ed. by N. B. Abraham, E. Garmire and P. Mandel, p. 319, Optical Society of America, 1991.
19. S. H. Jiang, D. L. MacFarlane and L. W. Casperson, "Timing and detuning studies of a synchronously pumped mode-locked dye laser," Optics Communications 80, 343 (1991).
20. D. L. MacFarlane and J. A. Tatum, "Optimization of gain switched diode lasers for high speed fiber optics," in Components for Fiber Optic Applications V, ed. by P. M. Kopera, Proc. SPIE 1365, p. 88, 1991.
21. D. L. MacFarlane, K. J. Strozewski and J. A. Tatum, "Mode-locked laser pulse train repetition frequency multiplication: the optical rattler," Applied Optics 30, 1042 (1991).
22. D. L. MacFarlane and D. M. Byrne, "A variable angle, fixed position, beam alignment device," Applied Optics 30, 1171 (1991).
23. D. L. MacFarlane, "Laser beam alignment devices for ultrafast optics," Review of Scientific Instruments 62, 1899 (1991).
24. D. M. Byrne and D. L. MacFarlane, "A new angular scanning mechanism for ellipsometers," Applied Optics 30, 4471 (1991).
25. J. A. Tatum and D. L. MacFarlane, "Ultrashort pulse propagation in visible semiconductor diode lasers," in Nonlinear Optics and Materials ed. by C. D. Cantrell and C. M. Bowden, Proc. SPIE 1497 p. 320, 1991.
26. Shoaib Zaidi and D. L. MacFarlane, "Mode evolution in a droplet," Optics Letters 17, 562 (1992).
27. D. L. MacFarlane and J. A. Tatum, "Short pulse generation in a visible diode laser by resonant excitation of a sustained oscillation," IEEE Journal of Quantum Electronics 28, 1320 (1992).
28. J. A. Tatum, J. W. Jennings and D. L. MacFarlane, "Compact, inexpensive, visible diode laser source of high repetition rate picosecond pulses," Review of Scientific Instruments 63, 2950 (1992).
29. D. L. MacFarlane, W. Y. Kim, J. S. Nilvi, T. Nuth and V. Tan, "Novel two dimensional laser scanning technique," Optics and Lasers in Engineering 17, 1 (1992).

30. D. L. MacFarlane and V. Narayan, "A relatively simple way to produce THz bursts of optical pulses," Review of Scientific Instruments 63, 4092 (1992).

31. Shoaib Zaidi and D. L. MacFarlane, "Mode evolution in optical resonators with a radial gain profile," Physical Review A 47, 588 (1993).

32. J. A. Tatum, D. L. MacFarlane and H. B. Serreze, "Tunable repetition rate optical spectroscopy with high power visible diode lasers," Review of Scientific Instruments 64, 2123 (1993).

33. D. L. MacFarlane and E. M. Dowling, "Three mirror etalons as analog bandpass filters for modulated optical signals," IEEE Photonics Technology Letters 5, 1089 (1993).

34. V. Narayan and D. L. MacFarlane, "Bursts and codes of ultrashort pulses," IEEE Photonics Technology Letters 5, 1465 (1993).

35. Shoaib Zaidi and D. L. MacFarlane, "Mode evolution and THz beam scanning in an optical resonator with a radial gain dependence," Society for Optical and Quantum Electronics Proceedings, 1993

36. D. L. MacFarlane and E. M. Dowling, "Z-domain techniques in the analysis of Fabry-Perot etalons and multilayer structures," Journal of the Optical Society of America A 11, 236 (1994).

37. E. M. Dowling and D. L. MacFarlane, "Lightwave lattice filters for optically multiplexed communication systems," IEEE Journal of Lightwave Technology 12, 471 (1994).

38. V. Narayan, E. M. Dowling and D. L. MacFarlane, "Design of multi-mirror structures for high frequency bursts and codes of ultrashort pulses," IEEE Journal of Quantum Electronics 30, 1671 (1994).

39. V. Narayan, D. L. MacFarlane and E. M. Dowling, "Analysis and design of optical lattice filters in the presence of imperfections," Optics Communications 110, 209 (1994).

40. D. L. MacFarlane, G. R. Schultz, P. D. Higley and J. Meyer, "A voxel based spatial display," in Stereoscopic Displays and Virtual Reality Systems, ed. by Scott S. Fisher, John O. Merritt and Mark T. Bolas, Proc. SPIE 2177, p. 196, 1994.

41. D. L. MacFarlane, V. Narayan, J. A. Tatum, W. R. Cox, T. Chen and D. J. Hayes, "Microjet fabrication of microlens arrays" IEEE Photonics Technology Letters 6, 1112 (1994).

42. J. A. Tatum, R. Strozewski, D. L. MacFarlane and H. B. Serreze, "Beam quality of high power broad area visible diode lasers," Optical and Quantum Electronics 26, 911 (1994).

43. D. L. MacFarlane, "Volumetric three dimensional display," Applied Optics 33, 7453 (1994).

44. D. L. MacFarlane, "Output power and coupling for a laser with excited state absorption," Optics Communications 113, 433 (1995).

45. J. A. Tatum, D. L. MacFarlane and H. B. Serreze, "Sustained Oscillations in AlGaInP Visible Diode Lasers," Optical and Quantum Electronics 27, 101 (1995).

46. E. Miltenyi, M. O. Ziegler, M. Hofmann, J. Sacher, W. Elsasser, E. O. Gobel, and D. L. MacFarlane, "Long term stable mode-locking of a visible diode laser with phase conjugate feedback," Optics Letters 20, 734 (1995).

47. D. L. MacFarlane, E. M. Dowling and V. Narayan, "Ring resonators with NxM couplers," (invited) Fiber and Integrated Optics 14 (3) 195 (1995).

48. V. Narayan, D. L. MacFarlane and E. M. Dowling, "High speed discrete time optical filtering," IEEE Photonics Technology Letters 7, 1042 (1995).

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