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Professional Experience

- 2003-Present Stanford University, Department of Electrical Engineering. **Professor:**
- Develop and teach graduate courses on Optical Fiber Communications and Digital Communications and undergraduate courses on Signal Processing.
- Research Areas:*
- High-capacity single-mode optical fiber systems, including: variable-rate coding and modulation techniques; modulation techniques for high spectral efficiency and impairment tolerance; coherent detection and associated digital signal processing algorithms; digital compensation of fiber nonlinearity.
 - High-speed transmission in multi-mode optical fiber, including: principal modes; adaptive spatial filtering; minimizing modal dispersion in single-input, single-output transmission; spatial multiplexing for multi-input, multi-output transmission.
 - Free-space optical communication through atmospheric turbulence, including: modeling spatial and temporal correlation of turbulence-induced fading; efficient transmission techniques, including coding, optimal detection, and spatial diversity detection.
 - Free-space optical communication for distributed sensor networks based on microelectromechanical systems, including: modeling and fabrication of corner-cube retroreflectors for passive optical links; detection and multiple-access techniques; demonstration prototypes.
 - Air-to-air free-space optical communication, including: fabrication of two-axis beam scanners using microelectromechanical systems; design of efficient link acquisition protocols; demonstration of prototype systems.
- 2003-2008 StrataLight Communications, Inc., Campbell, CA. **Advisory Board Member and Consultant:**
- Provided strategic technical advice.
 - Evaluated new technologies, including digital coherent detection.
- 2000-2003 StrataLight Communications, Inc., Campbell, CA. **Co-Founder and Chief Scientist:**
- Played key role in securing \$22.7M Series A and Series B financing.
 - Developed strong patent portfolio on optical modulation techniques to increase spectral efficiency and improve impairment tolerance in DWDM long-haul systems.
 - Oversaw development of 40 Gb/s transceiver subsystem for DWDM long-haul systems. Specified and characterized custom high-speed mixed-signal integrated circuits and photonic components.
 - Oversaw testing and simulation of 40 Gb/s DWDM long-haul systems using erbium-doped fiber amplifiers, distributed Raman amplifiers and chromatic dispersion compensation.
- 1998-2000 University of California, Berkeley, Department of Electrical Engineering and Computer Sciences.
Vice Chairman for Graduate Matters:
- Restructured funding and recruitment of EECS graduate students, achieving significant increase in yield of top admits.
- 1996-2003 University of California, Berkeley, Department of Electrical Engineering and Computer Sciences.
Professor:

- Developed and taught undergraduate courses, including Signals and Systems, Signals and Systems Laboratory, and graduate courses, including Digital Communications, Applied Electromagnetic Theory, and Quantum Electronics.
- Chaired key committees, including Faculty Recruiting and Graduate Admissions.

Research Areas:

- High-capacity optical fiber systems, including: coherent detection of optical quadriphase-shift keying; electrical crosstalk cancellation in DWDM systems; nonlinear equalization techniques for optimal utilization in subcarrier-multiplexed systems.
- Free-space optical communication through atmospheric turbulence.
- Wireless communication for distributed sensor networks based on microelectromechanical systems (“Smart Dust”).
- Covert air-to-air free-space optical communication.
- Indoor free-space optical communication, including: 100 Mb/s quasi-diffuse link using imaging diversity receiver; 50 Mb/s diffuse infrared link using decision-feedback equalization; coded modulation techniques; equalization techniques; characterization and modeling of multipath channels; multiple-access techniques; transmitting and receiving optical components.
- Multi-antenna wireless communication systems, including: effect of correlated fading on channel capacity; design and performance evaluation of space-time codes; optimal power-allocation techniques.

1993-96 University of California, Berkeley, Department of Electrical Engineering and Computer Sciences.
Associate Professor.

1990-93 University of California, Berkeley, Department of Electrical Engineering and Computer Sciences.
Assistant Professor.

1987-90 AT&T Bell Laboratories, Lightwave Communications Research Department, Holmdel, New Jersey.
Member of Technical Staff:

- Built multi-gigabit-per-second homodyne optical-fiber transmission systems that achieved world-record receiver sensitivities.
- Developed high-stability, narrow-linewidth, tunable external-cavity semiconductor lasers.
- Collaborated in design and construction of wideband, low-noise optical phase-lock receivers.
- Demonstrated phase-noise-tolerant optical phase-locked loop using quantized feedback.
- Experimented with high-speed nonlinear signal processing including an integrate-and-dump circuit.
- Modeled and characterized traveling-wave lithium niobate phase modulators.

1982-87 University of California, Berkeley, Department of Physics. **Research Assistant:**

- Studied impurities in semiconductors using photoconductive and deep-level-transient spectroscopies.
- Constructed a high-resolution Fourier-transform infrared spectrometer system and related electronic, optical and cryogenic equipment.
- Developed apparatus and process for tritium doping of semiconductors in a plasma.

Education

1986 Ph.D. Physics, University of California, Berkeley
Thesis title: “Hydrogen-Related Acceptor Complexes in Germanium”
Thesis advisors: Professors L.M. Falicov and E.E. Haller

1983 M.A. Physics, University of California, Berkeley

1981 A.B. Physics, University of California, Berkeley

Awards, Honors and Fellowships

2003-05	Hoover Faculty Scholar, Stanford University
2000	Elected Fellow of the Institute of Electrical and Electronics Engineers
1991-96	Presidential Young Investigator Award, National Science Foundation
1981-82	Regents Fellowship, University of California
1981	Phi Beta Kappa

Professional Society Memberships

1987-Present	Institute of Electrical and Electronic Engineers (Fellow Grade, Member of Communications Society and Photonics Society)
1983-87	American Physical Society

Professional Service

2009-Present	IEEE/OSA <i>Journal of Optical Communications and Networking</i> , Associate Editor
1993-2000	IEEE <i>Personal Communications Magazine</i> , Technical Editor
1996	ACM/Baltzer <i>J. of Wireless Networks</i> , Guest Editor, Special Series on Free-Space Optical LANs
1996-99	<i>Intl. J. on Wireless Info. Networks</i> , Guest Editor, Special Series on Wireless Infrared Communication

Volunteer Work

1987-89	Tutor at Red Bank Middle School, Red Bank, New Jersey
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Patents

1. J. M. Kahn and E. Ip, "Optical Receivers and Communication Systems", U. S. Patent application filed April 24, 2009.
2. K.-P. Ho and J. M. Kahn, "Optical Transceiver Having High Tolerance for Dispersion and Facilitating Parallel Implementation", U. S. Patent application filed October 22, 2008.
3. J. M. Kahn, M. A. Horowitz, O. Solgaard and S. Fan, "Adaptive Optical Signal Processing with Multimode Waveguides", U. S. Patent 7,844,144, November 30, 2010.
4. J. M. Kahn, S. Fan, M. A. Horowitz and O. Solgaard, "Adaptive Optical Signal Processing with Multimode Waveguides", U. S. Patent 7,509,002, March 24, 2009.
5. J. M. Kahn, S. Fan, M. A. Horowitz and O. Solgaard, "Adaptive Optical Signal Processing with Multimode Waveguides", U. S. Patent 7,327,914, February 5, 2008.
6. K.-P. Ho and J. M. Kahn, "Method and System to Provide Modular Parallel Precoding in Optical Duobinary Transmission Systems", U. S. Patent 7,287,213, October 23, 2007.
7. J. M. Kahn, M. A. Horowitz, E. Alon and V. Stojanovic, "Adaptive Control for Mitigating Interference in a Multimode Transmission Medium", U. S. Patent 7,194,155, March 20, 2007.
8. K.-P. Ho and J. M. Kahn, "Differential Complex Modulation Optical Receiver Having Compensation for Kerr Effect Phase Noise", U.S. Patent 7,162,163, January 9, 2007.
9. K.-P. Ho and J. M. Kahn, "Optical FSK Receiver Having Compensation for Kerr Effect Phase Noise", U.S. Patent 7,133,620, November 7, 2006.
10. K.-P. Ho and J. M. Kahn, "Optical Receiver Having Compensation for Kerr Effect Phase Noise", U.S. Patent 7,013,089, March 14, 2006.
11. K.-P. Ho and J. M. Kahn, "Optical Receiver Having Compensation for Kerr Effect Phase Noise", U.S. Patent 6,915,084, July 5, 2005.
12. K.-P. Ho and J. M. Kahn, "Multilevel Optical Signals Optimized for Systems having Signal-Dependent and Signal-Independent Noises, Finite Transmitter Extinction Ratio and Intersymbol Interference", U.S. Patent 6,690,894, February 10, 2004.
13. J. M. Kahn and K.-P. Ho, "Transmission and Reception of Duobinary Multilevel Pulse-Amplitude-Modulated Optical Signals Using Finite-State Machine-Based Encoder", U.S. Patent 6,592,274, July 15, 2003.

14. J. M. Kahn and K.-P. Ho, "Transmission and Reception of Duobinary Multilevel Pulse-Amplitude-Modulated Optical Signals Using Subtraction-Based Encoder", U.S. Patent 6,490,069, December 3, 2002.
15. J. M. Kahn and K.-P. Ho, "Transmission and Reception of Duobinary Multilevel Pulse-Amplitude-Modulated Optical Signals Using Subsequence-Based Encoder", U.S. Patent 6,445,476, September 3, 2002.
16. J. M. Kahn and K.-P. Ho, "Transmission and Reception of Duobinary Multilevel Pulse-Amplitude-Modulated Optical Signals Using Finite-State Machine-Based Encoder", U.S. Patent 6,424,444, July 23, 2002.
17. J. M. Kahn and B. L. Kasper, "Optical Homodyne Receiver", U.S. Patent 5,007,106, April 9, 1991.

Books and Book Chapters

18. M. B. Shemirani and J. M. Kahn, *Principal Modes in Multimode Fiber: Modeling and Compensation of Dispersion*, VDM Verlag, Saarbrücken, Germany, 2010.
19. E. Ip and J. M. Kahn, "Nonlinear Impairment Compensation using Backpropagation", in *Optical Fibre, New Developments*, C. Lethien, Ed., In-Tech, Vienna Austria, December 2009.
20. X. Zhu and J. M. Kahn, "Communication Techniques and Coding for Atmospheric Turbulence Channels", in *Free-Space Laser Communications: Principles and Advances*, A. K. Majumdar and J. C. Ricklin, Eds., Springer, New York, 2008.

Journal Articles

21. R. Nasiri Mahalati, D. Askarov, J. P. Wilde and J. M. Kahn, "Optimal Control of Input Field to Achieve Desired Output Intensity Profile in Multimode Fiber with Random Mode Coupling", subm. to *Optics Express*, March 2012.
22. D. J. F. Barros, J. M. Kahn, J. P. Wilde and T. Abou Zeid, "Bandwidth-Scalable Long-Haul Transmission using Synchronized Colorless Transceivers and Efficient Wavelength-Selective Switches", subm. to *J. of Lightwave Technol.*, November 2011.
23. G.-H. Gho and J. M. Kahn, "Rate-Adaptive Modulation and Low-Density Parity-Check Coding for Optical Fiber Transmission Systems", subm. to *J. of Lightwave Technol.*, August, 2011.
24. G.-H. Gho and J. M. Kahn, "Rate-Adaptive Modulation and Coding for Optical Fiber Transmission Systems", to be published in *J. of Lightwave Technol.*
25. D. J. F. Barros, S. K. Wilson and J. M. Kahn, "Comparison of Orthogonal Frequency-Division Multiplexing and Pulse-Amplitude Modulation in Indoor Optical Wireless Links", *IEEE Trans. on Commun.*, vol. 60, no. 1, pp. 153-163, January 2012.
26. R. Nasiri Mahalati and J. M. Kahn, "Effect of Fog on Free-Space Optical Links Employing Imaging Receivers", *Optics Express*, vol. 20, no. 2, pp. 1649-1661, January 11, 2012.
27. K.-P. Ho and J. M. Kahn, "Frequency Diversity in Mode-Division Multiplexing Systems", *J. of Lightwave Technol.*, vol. 29, no. 24, pp. 3719-3726, December 15, 2011.
28. K.-P. Ho and J. M. Kahn, "Statistics of Group Delays in Multimode Fiber with Strong Mode Coupling", *J. of Lightwave Technol.*, vol. 29, no. 21, pp. 3119-3128, November 1, 2011.
29. A. Belmonte and J. M. Kahn, "Field Conjugation Adaptive Arrays in Free-Space Coherent Laser Communications", *J. Optical Commun. Netw.*, vol. 3, no. 11, pp. 830-838, November 2011.
30. K.-P. Ho and J. M. Kahn, "Mode-Dependent Loss and Gain: Statistics and Effect on Mode-Division Multiplexing", *Optics Express*, vol. 19, no. 17, pp. 16612-16635, August 15, 2011 (Invited Paper).
31. D. J. F. Barros and J. M. Kahn, "Comparison of Orthogonal Frequency-Division Multiplexing and On-Off Keying in Direct-Detection Multimode Fiber Links", *J. of Lightwave Technol.*, vol. 29, no. 15, pp. 2299-2309, August 1, 2011.
32. Y. Huo, S. Sandhu, J. Pan, N. Stuhmann, M. L. Povinelli, J. M. Kahn, J. S. Harris, M. M. Fejer and S. Fan, "Experimental Demonstration of Two Methods for Controlling the Group Delay in a System with Photonic-Crystal Resonators Coupled to a Waveguide", *Optics Lett.*, vol. 36, no 8, pp. 1482-1484, April 15, 2011.

33. G.-H. Gho, L. Klak and J. M. Kahn, "Rate-Adaptive Coding for Optical Fiber Transmission Systems", *J. of Lightwave Technol.*, vol. 29, no. 2, pp. 222-233, January 15, 2011.
34. M. B. Shemirani, J. P. Wilde and J. M. Kahn, "Adaptive Compensation of Multimode Fiber Dispersion by Control of Launched Amplitude, Phase, and Polarization", *J. of Lightwave Technol.*, vol. 28, no. 18, pp. 2627-2639, September 15, 2010.
35. M. B. Shemirani and J. M. Kahn, "Compensation of Multimode Fiber Dispersion by Optimization of Launched Amplitude, Phase, and Polarization", *J. of Lightwave Technol.*, vol. 28, no. 14, pp. 2084-2095, July 15, 2010.
36. D. J. F. Barros and J. M. Kahn, "Comparison of Orthogonal Frequency-Division Multiplexing and On-Off Keying in Amplified Direct-Detection Single-Mode Fiber Systems", *J. of Lightwave Technol.*, vol. 28, no. 12, pp. 1811-1820, June 15, 2010.
37. C. Belthangady, C.-S. Chuu, I. A. Yu, G. Y. Yin, J. M. Kahn and S. E. Harris, "Hiding Single Photons With Spread Spectrum Technology", *Phys. Rev. Lett.*, vol. 104, 223601, June 4, 2010.
38. A. Belmonte and J. M. Kahn, "Efficiency of Complex Modulation Methods in Coherent Free-Space Optical Links", *Optics Express*, vol. 18, no. 4, pp. 3928-3937, February 15, 2010.
39. E. Ip and J. M. Kahn, "Fiber Impairment Compensation using Coherent Detection and Digital Signal Processing", *J. of Lightwave Technol.*, vol. 28, no. 4, pp. 502-519, February 15, 2010 (Invited Paper).
40. R. A. Panicker, A. P. T. Lau, J. P. Wilde and J. M. Kahn, "Experimental Comparison of Adaptive Optics Algorithms in 10-Gb/s Multimode Fiber Transmission", *J. of Lightwave Technol.*, vol. 27, no. 24, pp. 5783-5789, December 15, 2009.
41. R. A. Panicker and J. M. Kahn, "Algorithms for Compensation of Multimode Fiber Dispersion Using Adaptive Optics", *J. of Lightwave Technol.*, vol. 27, no. 24, pp. 5790-5799, December 15, 2009.
42. M. B. Shemirani and J. M. Kahn, "Higher-Order Modal Dispersion in Graded-Index Multimode Fiber", *J. of Lightwave Technol.*, vol. 27, no. 23, pp. 5461-5468, December 1, 2009.
43. A. Belmonte and J. M. Kahn, "Capacity of Coherent Free-Space Optical Links using Diversity Combining Techniques", *Optics Express*, vol. 17, no. 15, pp. 12601-12611, July 10, 2009.
44. E. Ip and J. M. Kahn, "Addendum to: Feedforward Carrier Recovery for Coherent Optical Communications", *J. of Lightwave Technol.*, vol. 27, no. 13, pp. 2552-2553, July 1, 2009.
45. D. J. F. Barros and J. M. Kahn, "Optical Modulator Optimization for Orthogonal Frequency-Division Multiplexing", *J. of Lightwave Technol.*, vol. 27, no. 13, pp. 2370-2378, July 1, 2009.
46. M. B. Shemirani, W. Mao, R. A. Panicker and J. M. Kahn, "Principal Modes in Graded-Index Multimode Fiber in Presence of Spatial- and Polarization-Mode Coupling", *J. of Lightwave Technol.*, vol. 27, no. 10, pp. 1248-1261, May 15, 2009. Also see errata: *J. of Lightwave Technol.*, vol. 29, no. 12, p. 1900, June 15, 2011.
47. A. Belmonte and J. M. Kahn, "Capacity of Coherent Free-Space Optical Links using Atmospheric Compensation Techniques", *Optics Express*, vol. 17, no. 4, pp. 2763-2773, February 16, 2009.
48. E. Ip and J. M. Kahn, "Compensation of Dispersion and Nonlinear Effects using Digital Backpropagation", *J. of Lightwave Technol.*, vol. 26, no. 20, pp. 3416-3425, October 15, 2008.
49. A. Belmonte and J. M. Kahn, "Performance of Synchronous Receivers using Atmospheric Compensation Techniques", *Optics Express*, vol. 16, no. 18, pp. 14151-14162, August 26, 2008.
50. D. J. F. Barros and J. M. Kahn, "Optimized Dispersion Compensation Using Orthogonal Frequency-Division Multiplexing", *J. of Lightwave Technol.*, vol. 26, no. 16, pp. 2889-2898, August 15, 2008.
51. A. P. T. Lau, S. Rabbani and J. M. Kahn, "On the Statistics of Intra-Channel Four-Wave Mixing in Phase-Modulated Optical Communication Systems", *J. of Lightwave Technology*, vol. 26, no. 14, pp. 2128-2135, July 15, 2008.
52. W. Mao and J. M. Kahn, "Lattice Codes for Amplified Direct-Detection Optical Systems", *IEEE Trans. on Commun.*, vol. 56, no. 7, pp. 1137-1145, July 2008.

53. R. A. Panicker, J. M. Kahn and S. P. Boyd, "Compensation of Multimode Fiber Dispersion using Adaptive Optics via Convex Optimization", *J. of Lightwave Technol.*, vol. 26, no. 10, pp. 1295-1303, May 2008.
54. E. Ip, A. P. T. Lau, D. J. F. Barros and J. M. Kahn, "Coherent Detection in Optical Fiber Systems", *Optics Express*, vol. 16, no. 2, pp. 753-791, January 21, 2008 (Invited Paper). Also see errata: *Optics Express*, vol. 16, no. 26, p. 21943, December 22, 2008.
55. A. P. T. Lau and J. M. Kahn, "Signal Design and Detection in Presence of Nonlinear Phase Noise", *J. of Lightwave Technol.*, vol. 25, no. 10, pp. 3008-3016, October 2007.
56. E. Ip and J. M. Kahn, "Feedforward Carrier Recovery for Coherent Optical Communications", *J. of Lightwave Technol.*, vol. 25, no. 9, pp. 2675-2692, September 2007.
57. E. Ip and J. M. Kahn, "Digital Equalization of Chromatic Dispersion and Polarization Mode Dispersion", *J. of Lightwave Technol.*, vol. 25, no. 8, pp. 2033-2043, August 2007.
58. R. A. Panicker, J. P. Wilde, J. M. Kahn, D. F. Welch and I. Lyubomirsky, "10 × 10 Gb/s DWDM Transmission Through 2.2 km Multimode Fiber Using Adaptive Optics", *IEEE Photon. Technol. Lett.* vol. 19, no. 15, pp. 1154-1156, August 1, 2007.
59. A. P. T. Lau and J. M. Kahn, "Power Profile Optimization in Phase-Modulated Systems in Presence of Nonlinear Phase Noise", *IEEE Photon. Technol. Lett.*, vol. 18, no. 23, pp. 2514-2516, December 1, 2006.
60. A. P. T. Lau and J. M. Kahn, "Design of Inline Amplifier Gains and Spacings to Minimize Phase Noise in Optical Transmission Systems", *J. of Lightwave Technol.*, vol. 24, no. 3, pp. 1334-1341, March 2006.
61. E. Ip and J. M. Kahn, "Power Spectra of Return-to-Zero Optical Signals", *J. of Lightwave Technol.*, vol. 24, no. 3, pp. 1610-1618, March 2006.
62. L. Zhou, J. M. Kahn and K. S. J. Pister, "Scanning Micromirrors Fabricated by an SOI/SOI Wafer Bonding Process", *IEEE J. of Microelectromech. Syst.*, vol. 15, no. 1, pp. 24-32, February 2006.
63. E. Ip and J. M. Kahn, "Carrier Synchronization for 3- and 4-bit-per-Symbol Optical Transmission", *J. of Lightwave Technol.*, vol. 23, no. 12, pp. 4110-4124, December 2005.
64. X. Shen, J. M. Kahn and M. A. Horowitz, "Compensation for Multimode Fiber Dispersion by Adaptive Optics", *Optics Lett.*, vol. 30, no. 22, pp. 2985-2987, November 15, 2005.
65. E. Ip, J. M. Kahn, D. Anthon and J. Hutchins, "Linewidth Measurements of MEMS-Based Tunable Lasers for Phase-Locking Applications", *IEEE Photon. Technol. Lett.*, vol. 17, no. 10, pp. 2029-2031, October 2005.
66. S. Fan and J. M. Kahn, "Principal Modes in Multi-Mode Waveguides", *Optics Lett.*, vol. 30, no. 2, pp. 135-137, January 15, 2005.
67. J. Wang and J. M. Kahn, "Accurate Bit-Error Ratio Computation in Nonlinear CRZ-OOK and CRZ-DPSK Systems", *IEEE Photon. Technol. Lett.*, vol. 16, no. 9, pp. 2165-2167, September 2004.
68. J. Wang and J. M. Kahn, "Conventional DPSK vs. Symmetrical DPSK: Comparison of Dispersion Tolerances", *IEEE Photon. Technol. Lett.*, vol. 16, no. 6, pp. 1585-1587, June 2004.
69. J. Wang and J. M. Kahn "Performance of Electrical Equalizers in Optically Amplified OOK and DPSK Systems", *IEEE Photon. Technol. Lett.*, vol. 16, no. 5, pp. 1397-1399, May 2004.
70. J. M. Kahn and K.-P. Ho, "Spectral Efficiency Limits and Modulation/Detection Techniques for DWDM Systems", *IEEE J. on Sel. Topics in Quantum Electron.*, vol. 10, no. 2, pp. 259-272, March/April 2004 (Invited Paper).
71. K.-P. Ho and J. M. Kahn, "Electronic Compensation Technique to Mitigate Nonlinear Phase Noise", *J. Lightwave Technol.*, vol. 22, no. 3, pp. 779-783, March 2004.
72. K.-P. Ho and J. M. Kahn, "Spectrum of Externally Modulated Optical Signals", *J. of Lightwave Technol.*, vol. 22, no. 2, pp. 658-663, February 2004.
73. J. Wang and J. M. Kahn, "Impact of Chromatic and Polarization-Mode Dispersions on DPSK Systems using Interferometric Demodulation and Direct Detection", *J. of Lightwave Technol.*, vol. 22, no. 2, pp. 362-371,

February 2004.

74. W. Mao and J. M. Kahn, "Free-space Heterochronous Imaging Reception of Multiple Optical Signals", *IEEE Trans. on Commun.*, vol. 52, no. 2, pp. 269-279, February 2004.
75. X. Zhu and J. M. Kahn, "Performance Bounds for Coded Free-Space Optical Communications through Atmospheric Turbulence Channels", *IEEE Trans. on Commun.*, vol. 51, no. 8, pp. 1233-1239, August 2003.
76. L. Zhou, J. M. Kahn and K.S.J. Pister, "Corner-Cube Retroreflectors Based on Structure-Assisted Assembly for Free-Space Optical Communication", *IEEE J. on Microelectromechanical Systems*, vol. 12, no. 3, pp. 233-242, June 2003.
77. X. Zhu and J. M. Kahn, "Queueing Models of Optical Delay Lines in Synchronous and Asynchronous Optical Packet-Switching Networks", *Optical Engineering*, vol. 42, no. 6, pp. 1741-1748, June 2003.
78. X. Zhu, J. M. Kahn and J. Wang, "Mitigation of Turbulence-Induced Scintillation Noise in Free-Space Optical Links using Temporal-Domain Detection Techniques", *IEEE Photon. Technol. Lett.*, vol. 15, no. 4, pp. 623-625, April 2003.
79. X. Zhu and J. M. Kahn, "Markov Chain Model in Maximum-Likelihood Sequence Detection for Free-Space Optical Communication through Atmospheric Turbulence Channels", *IEEE Trans. on Commun.*, vol. 51, no. 3, pp. 509-516, March 2003.
80. J. Wang, J. M. Kahn and K. Y. Lau, "Minimization of Acquisition Time in Short-Range Free-Space Optical Communication", *Applied Optics*, vol. 41, no. 12, pp. 7592-7602, December 2002.
81. X. Zhu and J. M. Kahn, "Free-Space Optical Communication through Atmospheric Turbulence Channels", *IEEE Trans. on Commun.*, vol. 50, no. 8, pp. 1293-1300, August 2002.
82. C. Chuah, D. Tse, J. M. Kahn and R.A. Valenzuela, "Capacity Scaling in MIMO Wireless Systems Under Correlated Fading", *IEEE Trans. on Information Theory*, vol. 48, pp. 637-650, March 2002.
83. R. You and J. M. Kahn, "Upper-Bounding the Capacity of Optical IM/DD Channels with Multiple-Subcarrier Modulation and Fixed Bias using Trigonometric Moment Space Method", *IEEE Trans. on Information Theory*, vol. 48, pp. 514-523, February 2002.
84. X. Zhu, V.S. Hsu and J. M. Kahn, "Optical Modeling of MEMS Corner Cube Retroreflectors with Misalignment and Non-flatness", *IEEE J. on Sel. Topics in Quantum Electron.*, vol. 8, no. 1, pp. 26-32, January/February 2002.
85. R. You and J. M. Kahn, "Average Power Reduction Techniques for Multiple-Subcarrier Intensity-Modulated Optical Signals", *IEEE Trans. on Commun.* vol. 49, pp. 2164-2171, December 2001.
86. J. M. Kahn and K.-P. Ho, "A Bottleneck for Optical Fibres", *Nature*, vol. 411, pp. 1007-1010, June 28, 2001 (Invited Paper).
87. T. Ohtsuki and J. M. Kahn, "BER Performance of Turbo-Coded PPM CDMA Systems on Optical Fiber", *J. Lightwave Technol.*, vol. 18, no. 12, pp. 1776-1784, December 2000.
88. P. Djahani and J. M. Kahn, "Analysis of Infrared Wireless Links Employing Multi-Beam Transmitters and Imaging Diversity Receivers", *IEEE Trans. on Commun.*, vol. 48, no. 12, pp. 2077-2088, December 2000.
89. J. M. Kahn, R.H. Katz and K.S.J. Pister, "Emerging Challenges: Mobile Networking for 'Smart Dust'", *J. of Commun. and Networks*, vol. 2, no. 3, pp. 188-196, September 2000 (Invited Paper).
90. J. B. Carruthers and J. M. Kahn, "Angle Diversity for Nondirected Wireless Infrared Communication", *IEEE Trans. on Commun.*, vol. 48, no. 6, pp. 960-969, June 2000.
91. D. Shiu, G. Foschini, M. J. Gans and J. M. Kahn, "Fading Correlation and its Effect on the Capacity of Multi-Element Antenna Systems", *IEEE Trans. on Commun.* vol. 48, pp. 502-513, March 2000.
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93. D. Shiu and J. M. Kahn, "Differential Pulse-Position Modulation for Power-Efficient Optical Communication", *IEEE Trans. on Commun.*, vol. 47, no. 8, pp. 1201-1210, August 1999.

94. M. D. Audeh, J. M. Kahn and J. R. Barry, "Decision-Feedback Equalization of Pulse-Position Modulation on Measured Non-Directed Indoor Infrared Channels", *IEEE Trans. on Commun.*, vol. 47, pp. 500-503, April 1999.
95. D. C. Lee and J. M. Kahn, "Coding and Equalization for PPM on Wireless Infrared Channels", *IEEE Trans. on Commun.*, vol. 47, no. 2, pp. 255-260, February 1999.
96. J. M. Kahn, P. Djahani, A. G. Weisbin, K. T. Beh, A. P. Tang and R. You, "Imaging Diversity Receivers for High-Speed Infrared Wireless Communications", *IEEE Communications Magazine*, vol. 36, no. 12, pp. 88-94, December 1998.
97. K.-P. Ho and J. M. Kahn, "Joint Design of Channel-Optimized Quantizer and Multicarrier Modulation", *IEEE Trans. on Commun.*, vol. 46, no. 10, pp. 1254-1257, October 1998.
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Invited Conference Presentations

147. J. M. Kahn, Daniel J. F. Barros and Sarah Kate Wilson, “Multi-Carrier versus Single-Carrier Intensity Modulation Techniques for Indoor Optical Wireless Links”, to be presented at IEEE Photonics Society Summer Topical on Optical Wireless Systems and Applications, Seattle, WA, July 9-11, 2012.
148. J. M. Kahn, K.-P. Ho and M. B. Shemirani, “Mode-Coupling Effects in Multimode Fibers”, *Proc. of Optical Fiber Commun. Conf.*, Los Angeles, CA, March 4-8, 2012.
149. J. M. Kahn, “Bandwidth-Scalable OFDM Long-Haul Transmission”, *Proc. of IEEE Photonics 2011 Conference*, Arlington, VA, October 9-13, 2011.
150. D. J. F. Barros, J. M. Kahn and S. K. Wilson, “Comparison of Multi-Carrier and Single-Carrier Intensity Modulation Techniques for Indoor Optical Wireless Links”, *Proc. of IEEE Photonics 2011 Conference*, Arlington, VA, October 9-13, 2011.
151. D. J. F. Barros, J. M. Kahn, J. P. Wilde and T. Abou Zeid, “System Architecture for Bandwidth-Scalable OFDM Long-Haul Transmission”, *Proc. of IEEE Photon. Soc. Summer Topical Meeting on Terabit Optical Ethernet*, Montreal, QC, July 18-20, 2011.
152. J. M. Kahn, “Understanding and Exploiting Multimode Fiber Dispersion”, presented at OIDA Short-Distance High Density Optical Interconnects Roadmapping Workshop, Stanford, CA, April 12-13, 2011.
153. G.-H. Gho and J. M. Kahn, “Rate-Adaptive Modulation and Coding for Optical Fiber Transmission Systems”, *Proc. of SPIE Photonics West*, San Francisco, CA, January 22-27, 2011.

154. J. M. Kahn and G.-H. Gho, "Rate-Adaptive Transmission Techniques for Optical Fiber Systems", *Proc. of OSA Annual Meeting*, Rochester, NY, October 24-29, 2010.
155. G.-H. Gho and J. M. Kahn, "Rate-Adaptive Coding for Optical Fiber Transmission Systems", *Proc. of OSA Topical Meeting on Signal Processing in Photonic Communication*, Karlsruhe, Germany, June 21-24, 2010.
156. S. E. Harris, C. Belthangady, C.-S. Chuu, S. Du, P. Kolchin, S. Sensarn, I. A. Yu, J. M. Kahn and G. Y. Yin, "Modulation of Photons and Biphotons", *Proc. of OSA Conference on Lasers and Electro-Optics*, San Jose, CA, May 16-21, 2010.
157. A. Belmonte and J. M. Kahn, "Analysis of a Field-Conjugation Adaptive Array for Coherent Free-Space Optical Links", *Proc. of OSA Topical Meeting on Applications of Lasers for Sensing and Free Space Communications*, San Diego, CA, January 31-February 3, 2010.
158. A. Belmonte and J. M. Kahn, "Understanding the Performance of Atmospheric Free-Space Laser Communications Systems using Coherent Detection", *Proc. of SPIE Photonics West*, San Francisco, CA, January 23-28, 2010, paper number 7588-1.
159. A. Belmonte and J. M. Kahn, "Fundamental Limits on Diversity Coherent Reception on Atmospheric Optical Channels", *Proc. of Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, November 1-4, 2009.
160. M. B. Shemirani and J. M. Kahn, "Principal Modes in Graded-Index Multimode Fibers", *Proc. of OSA Annual Meeting*, San Jose, CA, October 11-15, 2009.
161. J. M. Kahn and E. Ip, "Principles of Digital Coherent Receivers for Optical Communications", *Proc. of Optical Fiber Communications Conference*, San Diego, CA, March 22-26, 2009.
162. E. Ip and J. M. Kahn, "Increasing Optical Fiber Transmission Capacity Beyond Next-Generation Systems", *Proc. of IEEE Lasers and Electro-Optics Society Annual Meeting*, Newport Beach, CA, November 9-13, 2008.
163. E. Ip, A. P. T. Lau, D. J. F. Barros and J. M. Kahn, "Compensation of Dispersion and Nonlinearity in WDM Transmission using Simplified Digital Backpropagation", *Proc. of IEEE LEOS Summer Topical on Coherent Optical Communication Systems*, Acapulco, Mexico, July 21-23, 2008.
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165. A. Belmonte and J. M. Kahn, "Performance of Synchronous or Nonsynchronous Receivers Using Atmospheric Compensation Techniques", *Proc. of OSA Topical Meeting on Coherent Optical Technologies and Applications*, Boston, MA, July 13-16, 2008.
166. J. M. Kahn, "Spectral Efficiency Limits and How to Approach Them", Panel Presentation at IEEE LEOS Summer Topical on Advanced Digital Signal Processing in Next-Generation Fiber-Optic Transmission, Portland, OR, July 23-25, 2007.
167. J. M. Kahn and E. Ip, "Advanced Modulation Formats and Digital Signal Processing in Optical Communications", *Proc. of Conference on Lasers and Electro-Optics*, Baltimore, MD, May 7-11, 2007
168. J. M. Kahn, "Compensating Multimode Fiber Dispersion using Adaptive Optics", *Proc. of Optical Fiber Communications Conference*, paper number OTuL1, Anaheim, CA, March 25 - 29, 2007.
169. J. M. Kahn and L. G. Kazovsky, "Coherent Optical Communications: Fundamentals and Future Prospects", *Proc. of OSA Annual Meeting*, Rochester, NY, October 8-12, 2006.
170. K.-P. Ho and J. M. Kahn, "Electronic Compensation of Linear and Nonlinear Impairments in Phase-Modulated Systems", *Proc. of OSA Annual Meeting*, Rochester, NY, October 8-12, 2006.
171. J. M. Kahn, "Modulation and Detection Techniques for Optical Communication Systems", *Proc. of OSA Topical Meeting on Coherent Optical Technologies and Applications*, paper number CThC1, Whistler, BC, June 28-30, 2006.
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 180. J. M. Kahn, "Spectral Efficiency and Coherent Detection in Optical Communications", Defense Sciences Research Council Workshop on Novel Applications of Optical Coherence, Arlington, VA, June 25, 2002.
 181. J. M. Kahn, "Ultimate Spectral Efficiency Limits in DWDM Systems", Optical Fiber Commun. Conf., Anaheim, CA, March 17-22, 2002, panel session W202, "Modulation Formats and Ultimate Capacity".
 182. W. Mao and J. M. Kahn, "Free-space Heterochronous Imaging Reception of Multiple Optical Signals", *Proc. of 35th Asilomar Conference on Signals, Systems and Computers*, pp. 18-22, Pacific Grove, CA, November 4-7, 2001.
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 185. D. Shiu and J. M. Kahn, "Scalable Layered Space-Time Codes for Wireless Communications: Performance Analysis and Design Criteria", *Proc. of IEEE Wireless Commun. and Networking Conf.*, pp. 159-163, New Orleans, LA, September 21-24, 1999.
 186. J. M. Kahn, "Infrared Wireless Communications", tutorial session at IEEE Global Commun. Conf., Sydney, Australia, November 8-12, 1998.
 187. J. M. Kahn, "Wireless Infrared Communications", tutorial session at IEEE Intl. Conf. on Commun., Atlanta, GA, June 7-11, 1998.
 188. J. M. Kahn, "Wireless Infrared Communications", tutorial session at 8th IEEE Intl. Symp. on Personal, Indoor, and Mobile Radio Communications, Helsinki, Finland, September 1-4, 1997.
 189. J. M. Kahn, "Wireless Infrared Communications", tutorial session at IEEE Hot Interconnects V Symposium, Stanford University, Stanford, CA, August 21-23, 1997.
 190. J. M. Kahn, "Infrared Wireless Communications: Recent Results", DIMACS (Center for Discrete Mathematics and Theoretical Computer Science) Workshop on Network Switching, Princeton, NJ, July 7-9, 1997.
 191. J. M. Kahn, "Infrared Wireless Communication", tutorial session at 7th IEEE Intl. Symp. on Personal, Indoor, and Mobile Radio Communications, Taipei, Taiwan, October 15-18, 1996.

192. J. M. Kahn, "Tetherless Optical Networks", tutorial session at IEEE Intl. Conf. on Commun., Dallas, Texas, June 23-27, 1996.
193. J. M. Kahn, "Wireless Optical Local-Area Networks", tutorial session at IEEE Hot Interconnects III Symposium, Stanford University, Stanford, CA, August 10-12, 1995.
194. J. M. Kahn, "High-Speed Wireless Infrared Communications", presented at 19th IEEE Computer Elements Workshop, Vail, CO, June 26-29, 1995.
195. J. M. Kahn, "Wireless Optical Local-Area Networks", tutorial session at Intl. Conf. on Commun., Seattle, WA, June 18-22, 1995.
196. J. R. Barry and J. M. Kahn, "Design of Non-Directed Infrared Links for High-Speed Wireless Networks", *Proc. of IEEE Lasers and Electro-Optics Society Annual Meeting*, p. 207, Boston, MA, October 31-November 1, 1994.
197. G. W. Marsh and J. M. Kahn, "50-Mb/s Diffuse Infrared Free-Space Link Using On-Off Keying with Decision Feedback Equalization", *Proc. of 28th Asilomar Conference on Signals, Systems and Computers*, pp. 74-77, Pacific Grove, CA, October 31-November 2, 1994.
198. J. M. Kahn, "Wireless Optical LANs", tutorial session at 5th IEEE Intl. Symp. on Personal, Indoor, and Mobile Radio Communications, The Hague, Netherlands, September 21-23, 1994.
199. G. W. Marsh and J. M. Kahn, "50-Mb/s Diffuse Infrared Free-Space Link Using On-Off Keying with Decision Feedback Equalization", *Proc. of 5th IEEE Intl. Symp. on Personal, Indoor, and Mobile Radio Communications*, pp. 1086-1089, The Hague, Netherlands, September 21-23, 1994.
200. J. M. Kahn and J. S. Hoch, "Simulation Tools for Free-Space Optical Interconnects Based on Computer-Generated Holograms", *Proc. of LEOS Topical Meeting on Hybrid Optoelectronic Integration and Packaging*, pp. H45-H46, Santa Barbara, CA, July 26-28, 1993.
201. J. M. Kahn, "Free-Space Infrared Communication for Wireless Indoor Networks", *Proc. of IEEE Lasers and Electro-Optics Society Annual Meeting*, pp. 236-237, Boston, MA, November 15-20, 1992.
202. J. M. Kahn, "Free-Space Infrared Communication for Wireless Indoor Networks", *Proc. of 26th Asilomar Conference on Signals, Systems and Computers*, pp. 83-87, Pacific Grove, CA, October 26-28, 1992.
203. J. M. Kahn, J. R. Barry, M. D. Audeh, E. A. Lee, and D. G. Messerschmitt, "Design of High-Speed Wireless Links Using Non-Directional Infrared Radiation", in *Wireless Communications: Future Directions*, Kluwer Academic Publishers, 1992, pp. 109-126 (Proc. of Winlab Workshop on Third Generation Wireless Information Networks, East Brunswick, NJ, April 28-29, 1992).
204. J. R. Barry, J. M. Kahn, E. A. Lee, and D. G. Messerschmitt, "Modeling of Indoor Free-Space Infrared Propagation", *Proc. of IEEE Workshop on Wireless Local Area Networks*, pp. 81-87, Worcester, MA, May 9-10, 1991.
205. J. M. Kahn, "Homodyne Detection of Phase-Shift-Keying for Multi-Gigabit Lightwave Transmission," *Tech. Digest of Optical Fiber Commun. Conf.*, p. 211, San Francisco, CA, January 22-26, 1990.
206. J. M. Kahn, "Hydrogen-Related Complexes in Silicon and Germanium: Static or Dynamic Defects?," Gordon Res. Conf. on Point Defects, Line Defects and Interfaces in Semicond., Plymouth, NH, July 20-24, 1987.

Contributed Conference Presentations

207. K. J. Boucher, C. Jan, J. M. Kahn, J. P. Wilde, and O. Solgaard, "Spot Formation and Scanning Microscopy via Multimode Fibers", *Proc. of IEEE Photonics 2011 Conference*, Arlington, VA, October 9-13, 2011.
208. A. Belmonte and J. M. Kahn, "Field Conjugation Adaptive Arrays in Atmospheric Coherent Optical Links", *Proc. of SPIE Photonics West*, San Francisco, CA, January 22-27, 2011.
209. A. Belmonte and J. M. Kahn, "Field Conjugation Adaptive Arrays in Atmospheric Coherent Optical Links", *Proc. of 2010 Workshop on Optical Wireless Communications*, Globecom 2010, Miami, FL, December 6-10, 2010.
210. D. J. F. Barros and J. M. Kahn, "OFDM vs. OOK with MLSLSD for IM/DD Systems", *Proc. of Optical Fiber Commun. Conf.*, San Diego, CA, March 21-25, 2010.
211. A. Belmonte and J. M. Kahn, "Effects of Atmospheric Compensation Techniques on the Performance of

- Synchronous Receivers”, *Proc. of SPIE Conference on Optical Engineering and Applications*, San Diego, CA, August 2-6, 2009.
212. J. P. Wilde, G. W. Yoffe and J. M. Kahn, “Frequency Noise Characterization of a Widely Tunable Narrow-Linewidth DFB Laser Array Source”, *Proc. of Optical Fiber Communications Conference*, San Diego, CA, March 22-26, 2009.
 213. E. Ip, D. Büchter, H. Herrmann, C. Langrock, J. M. Kahn, W. Sohler and M. M. Fejer, ”QPSK Transmission over Free-Space Link at 3.8 μm using Coherent Detection with Wavelength Conversion”, *Proc. of Euro. Conf. on Optical Commun.*, Brussels, Belgium, September 21-25, 2008.
 214. A. P. T. Lau, S. Rabbani and J. M. Kahn, “On the Statistics of Intra-Channel Four-Wave Mixing in Phase-Modulated Optical Communication Systems”, *Proc. of Optical Fiber Communications Conference*, San Diego, CA, February 24-28, 2008.
 215. A. P. T. Lau and J. M. Kahn, “16-QAM Signal Design and Detection in Presence of Nonlinear Phase Noise”, *Proc. of IEEE LEOS Summer Topical on Advanced Digital Signal Processing in Next-Generation Fiber-Optic Transmission*, Portland, OR, July 23-25, 2007.
 216. A. P. T. Lau and J. M. Kahn, “Non-Optimality of Distributed Amplification in Presence of Nonlinear Phase Noise”, *Proc. of OSA Topical Meeting on Coherent Optical Technologies and Applications*, paper number JWB23, Whistler, BC, June 28-30, 2006.
 217. X. Shen, J. M. Kahn and M. A. Horowitz, “Compensation of Multimode Fiber Dispersion using Adaptive Optics”, *Proc. of 31st Euro. Conf. on Optical Commun.*, Glasgow, Scotland, September 25-29, 2005.
 218. E. Alon, V. Stojanović, J. M. Kahn, S. P. Boyd and M. A. Horowitz, “Equalization of Modal Dispersion in Multimode Fiber using Spatial Light Modulators”, *Proc. of IEEE Global Telecommun. Conf.*, Dallas, TX, Nov. 29-Dec. 3, 2004.
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