Alan Pak Tao Lau

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Research Interests:

- Signal Processing Techniques in Coherent Optical Fiber Communication Systems
- Adaptive Optics for Multi-mode fiber systems for 100Gb/s
- Source coding for wireless multi-user diversity systems

Professional Experience:

***Assistant Professor*, Department of Electrical Engineering,** Sept. 2008 - present
Hong Kong Polytechnic University, Hong Kong, China

- Develop research programs relating to fiber-optic communications
- Teach courses in fiber-optics and communications at both undergraduate and graduate levels

***Research Assistant*, Department of Electrical Engineering,** 2004 - 2008
Stanford University, Stanford, CA

- Developed signal processing algorithms and system design strategies for long-haul coherent fiber-optic communication systems limited by fiber nonlinearities
- Performed experiments for multimode fiber transmission systems using adaptive optics

***Research Associate*, NEC Laboratories America,** Summer 2006
Princeton, NJ

- Developed algorithms for exploiting modal multiplexing in multimode fiber communication systems for 100Gb/s Ethernet applications.
- Evaluated commercialization opportunities for electronic dispersion compensation technologies for long-haul fiber-optic communication systems.

***Research Assistant*, Department of Electrical and Computer** 2001-2004
Engineering, University of Toronto, Toronto, Ontario, Canada

- Developed optimal quantization schemes for feedback channels in wireless systems using multi-user diversity.
- Developed low-complexity enhancement to wireless DS-CDMA systems based on improved techniques in parallel interference cancellation.
- Lead a team of 4 university researchers and collaborated with Nortel Networks. Implemented FPGA testbeds for multi-user 10Gbps optical CDMA systems.

Education:

Ph.D. in Electrical Engineering June 2008
Stanford University, Stanford, California
Thesis Title: *Signal Processing Techniques for Coherent Optical Fiber Communication Systems in Presence of Kerr Nonlinearity*
Thesis Supervisor: Prof. Joseph M. Kahn

M.A.Sc. in Electrical and Computer Engineering June 2004
University of Toronto, Toronto, Ontario, Canada (GPA: 3.95/4.0)
(with fastest degree completion in the history of the Faculty of Engineering)
Thesis Title: Feedback Quantization in Multiuser Diversity Systems
Thesis Supervisor: Prof. Frank R. Kschischang

Education (continued):

B.A.Sc. in Engineering Science, Electrical Option June 2003
University of Toronto, Toronto, Ontario, Canada (GPA: 3.82/4.0)

Research Publications:

Journal Contributions: Published and under review

1. A.P.T. Lau and J.M. Kahn, "Design of Inline Amplifiers Gain and Spacing to Minimize Phase Noise in Optical Transmission Systems," *OSA/IEEE Journal of Lightwave Technology*, Mar 2006, pp.1334-1341.
2. A.P.T. Lau and J.M. Kahn, "Power Profile Optimization in Phase Modulated Systems in Presence of Nonlinear Phase Noise," *IEEE Photonics Technology Letters*, vol. 18, no. 23, pp. 2514-2516, Dec. 2006.
3. A.P.T. Lau, L. Xu and T. Wang, "Performance of Receivers and Detection Algorithms for Modal Multiplexing in Multimode Fiber Systems," *IEEE Photonics Technology Letters*, vol. 19, no. 14, pp.1087-1089, July 2007.
4. A.P.T. Lau and J.M. Kahn, "Signal Design and Detection in Presence of Nonlinear Phase Noise," *OSA/IEEE Journal of Lightwave Technology*, vol. 25, no. 10, pp. 3008-3016, Oct. 2007.
5. 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," *OSA/IEEE Journal of Lightwave Technology*. vol. 26, no. 14, pp. 2128-2135, Jul. 2008.
6. E. Ip, A.P.T. Lau, D.J.F. Barros and J.M. Kahn (Invited), "Coherent Detection in Optical Fiber Systems," *OSA Optics Express*, Jan. 2008.
7. R.A. Panicker, A.P.T. Lau, J.P. Wilde and J.M. Kahn, "10 Gb/s transmission over 2 km Multimode Fiber with Connector Offsets Using Adaptive Optics" to appear in *OSA/IEEE Journal of Lightwave Technology.*
8. A.P.T. Lau and T.J. Lim, "A Low Complexity Enhancement to Sub-Optimal CDMA Receivers", *IEEE Transactions on Wireless Communication*, vol. 3, no. 6, November 2004, pp. 1924-1927.
9. A.P.T. Lau and F. Kschischang, "Optimal Feedback Quantization in Wireless Multiuser Diversity systems," *IEEE Transactions on Information Theory*, vol. 53, no. 4, pp. 1386-1400, Apr. 2007.
10. A.P.T. Lau and S. Cui, "Joint Power Minimization in Wireless Relay Channels," *IEEE Transactions on Wireless Communications*, vol. 6, no. 4, pp. 2820-2824, Aug. 2007.

Contributed Conference Presentations:

1. A.P.T. Lau and J.M. Kahn, "Non-Optimality of Distributed Amplification in Presence of Nonlinear Phase Noise", paper JWB23, *OSA Coherent Optical Technologies and Applications (COTA)*, Whistler, BC, Canada, June 2006.
2. A.P.T. Lau and S. Cui, "Joint Power Minimization in Wireless Relay Channels" Proceedings of *International Wireless Communications & Mobile Computing Conference*, Vancouver, July 2006.
3. A.P.T. Lau and J.M. Kahn,"16-QAM Signal Design and Detection in Presence of Nonlinear Phase Noise," Paper TuA4.4, 2007 *IEEE/LEOS Summer Topical Meetings*, Portland, OR, July 23-25, 2007.
4. A.P.T. Lau, S. Rabbani and J.M. Kahn, "On the statistics of Intra-channel Four-Wave Mixing in phase modulated systems," paper JThA52, *OFC/NFOEC*, San Diego, CA, Feb. 24-28, 2008.
5. J. M. Kahn, E. Ip, A.P.T. Lau and D.J.F. Barros, (Invited), "Digital Compensation of Linear and Nonlinear Impairments in Coherent Optical Receivers", *OSA Coherent Optical Technologies and Applications (COTA)*, Boston, MA, July 2008.
6. J. M. Kahn, E. Ip, A.P.T. Lau and D.J.F. Barros, (Invited), "Digital Compensation of Linear and Nonlinear Impairments in Coherent Optical Receivers", *IEEE/LEOS Summer Topical Meeting*, Acapulco, Mexico, July 2008.

Thesis/Dissertations:

- A.P.T. Lau, "Feedback Quantization in Wireless Mulituser Diversity Systems", M.A.Sc. Thesis, Department of Electrical and Computer Engineering, University of Toronto, April 2004.
- A.P.T. Lau, "Signal Processing Techniques for Coherent Communication Systems in Presence of Kerr Nonlinearity," Department of Electrical Engineering, Stanford University, March 2008.

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Professional Service:

Reviewer for: OSA Optics Express
IEEE Transactions on Communications
IEEE Transactions on Wireless Communications

Fellowships, Honors and Awards (selected):

- Macau SAR Postgraduate Scholarship (MOP $135000)
- National Science and Engineering Research Council of Canada (NSERC) Postgraduate Scholarship D2 (CDN $42000)
- National Science and Engineering Research Council of Canada (NSERC) Postgraduate Scholarship A (CDN $35000)
- Record holder for the fastest completion of the Master's of Applied Science program in Faculty of Engineering, University of Toronto
- Faculty of Engineering Dean's Honor List 1999-2003

Community Service:

- President, Stanford Hong Kong Students Association (http://hksa.stanford.edu)
- External Vice President and Director of Music, UNIQUE Productions and Publications, University of Toronto (http://www.utunique.org)
- University of Toronto Engineering stage band, saxophone, piano player