

# Curriculum Vitae — Michael J. Ferguson

**Name:** Michael J. Ferguson

**Date of Birth:** May 7, 1941

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## Education:

**Baccalaureat:** B.A.Sc in Engineering Physics, University of Toronto, 1962

**Masters:** M.S. in Electrical Engineering, California Institute of Technology, 1963.

**Doctorat:** Ph.D. in Electrical Engineering, Stanford University, 1966.

## Experience:

**Erskine Fellow:** COSC, Univ. of Canterbury, July/Dec, 2001

**Professeur Honoraire (Emeritus),** INRS-Telecommunications, Sept. 2001 – present

**Associate Professor, – 1982 to 1985; Professor – 1985 to 2001; Cyrille Duquet Professor of  
“Logiciel des Télécommunications , 1985 to 1997:** INRS-Télécommunications

**Invited Professor:** INRS-Télécommunications, 1978 - 1982.

**Senior Manager:** Systems Analysis Bell Northern Research (BNR), Montréal, 1978 - 1982.

**Research Scholar:** IIASA - International Institute of Applied Systems Analysis, Laxenburg,  
Austria, 1976 to 1978.

**Research Associate and Program Manager:** ALOHA System, University of Hawaii, 1974 - 1977.

**Assistant Professor, 1968 - 1972; Associate Professor, 1972 - 1976:** Dept. of Elect. Engineering, McGill University, Montréal

**Engineering Specialist, Ford Aerospace, Palo Alto, California, 1966 - 1968.**

## Honours

- Elected a **Fellow of the IEEE**, Jan. 1990 for *Contributions to the performance evaluation of multiple access data communication networks*.

## Some other professional activities

**Recent Invited Seminars:** “The Telephone, The Internet, and The New Telecommunications Infrastructure”, April 15, 2003, Universidad de Chile, Santiago, Chile & July 15, 2003, Gunma University, Gunma-Ken, Japan

### Short Courses

- “Protocol Specification, Verification, and Design”: This course was taught as an intensive course, over 5 full days, at Tait Electronics in Christchurch, New Zealand in Dec. 2001.
- “The Internet and Real Time Traffic”: This one day course was developed in conjunction with Prof. Jean-Charles Grégoire. I gave it on four different occasions in 1998/1999 to research groups at Nortel in Montréal and Ottawa.
- “Modeling, Validation and Testing with Extended Finite State machines, Message Sequence Charts, Regular Languages, and SDL”. This one day course was given twice in 1997. Each version of the course was customised to the specific BNR group that took it.

**Consultant:** Error Correcting codes with application to mobile radio, BNR and Nortel, 1985-1999 —

**Invited Panel Member:** “Information Age Collaboration between Teletraffic and Communications Software Experts — The case of Broadband Signalling”, Broadband’96, April 24, Montréal, 1996

**Programme Committee Member:** INFOCOM (1995, 1996, 1997, 1999, 2000), AMAST’95, FORTE’95, SDL Forum 1999

**Member:** T<sub>E</sub>X User Group Board of Directors, 1991-1996

**Chair:** ACM SIGCOMM, 1985-1987

**Editor:** Electronic Publishing and Protocols – IEEE Trans. on Communications – 1988-1992.

**Editor:** Computer Network Performance – IEEE Trans. on Communications – 1982-1988.

**General Chairman:** ACM SIGCOMM’84, Conference on “Communications Architectures and Protocols”, June 6-8, 1984.

## INRS-Télécommunications

From 1976 to 1999, the INRS-Télécommunications “campus” was co-located with the BNR Research Laboratories in Verdun, a suburb of Montréal. We encouraged student interaction by promoting informal contact between the students and the BNR scientists and engineers. In addition, we had a longer term, personal interaction with the BNR research and researchers. Our research contracts with BNR also afforded an opportunity to informally educate and train BNR personnel. Unlike most other universities, our close proximity with this client afforded us the chance of informal information exchange. During 1992 to 1998, with BNR contract support, I organised the “INRS/BNR Seminars on Formal Methods Applied to Telecommunication Software”. This seminar and workshop series brought in world renowned industrial and academic researchers in formal methods and was well attended by INRS, BNR and participants from local universities and industry.

In order to promote student contact with outside expertise, I instituted, what I think, was a unique educational experience – the *Cyrille Duquet Student Workshop*. The workshop was supported by the *Cyrille Duquet Chair for Telecommunication Software*. These informal all day workshops consisted of one student presenting their research work in the morning, and the outside guest researcher presenting their work, in the context of the student’s presentation, in the afternoon. The guests were from universities and industrial research laboratories in both North America and Europe. Not only did the students obtain an expert suggestions on their work, they made valuable contacts for future collaboration.

In 1999, Nortel closed their Laboratories in Verdun and INRS-Télécommunications moved to its present location in downtown Montréal.

## Publications

- [1] J.-C. Grégoire and M. J. Ferguson, “Practical challenges of proof by refinement: A TLA story,” in *Artificial Intelligence for Open Multimedia Networking* (F. Daoud, ed.), IOS Press, 2000.
- [2] J.-C. Grégoire and M. J. Ferguson, “Neglected topics of feature interactions: Mechanisms, architectures, requirements (invited),” in *Feature Interactions in Telecommunication Networks IV* (P. Dini, R. Boutaba, and L. Logrippo, eds.), (Montréal), pp. 3–12, IEEE, IOS Press, Amsterdam, jun 1997.
- [3] M. J. Ferguson and J.-C. Grégoire, “Interactions in telecommunication systems: Features, mechanisms, and architectures,” *submitted to Computer Networks and ISDN Systems*, sep 1997.
- [4] A. Mokkedem, M. J. Ferguson, and R. deB. Johnston, “A TLA solution to the specification and verification of the RLP1 retransmission protocol,” in *FME’97: Industrial Applications and Strengthened Foundations of Formal Methods* (J. Fitzgerald, C. B. Jones, and P. Lucas, eds.), LNCS 1313, (Graz, Austria), pp. 398–417, sep 1997.

- [5] M. J. Ferguson, "Formalization and validation of the radio link protocol (RLP1)," *Computer Networks and ISDN Systems*, vol. 29, pp. 357–372, feb 1997.
- [6] H. Erdogmus, R. Johnston, and M. J. Ferguson, "On the operational semantics of non-determinism and divergence," *Theoretical Computer Science*, vol. Volume 159, pp. 271–317, jun 1996.
- [7] M. J. Ferguson, "DQDB — an overload cycle analysis of generalized bandwidth balancing with strict priority enforcement," *Performance Evaluation*, vol. Vol. 23, pp. 53–65, jul 1995.
- [8] J.-C. Grégoire, M. J. Ferguson, and L. Pino, "Combining formal methods: An exercise in integration," in *Proceedings Forte'95* (G. Bochmann and R. Dssouli, eds.), (Montréal, Canada), pp. 295–302, IFIP, oct 1995.
- [9] M. J. Ferguson, "On the syntactic, semantic, and functional analysis of the RLP1 (layer2) protocol standard," Contribution TR45.3.2.5/94.06.10.01, Data Services Task Group of ANSI Accredited TIA TR45-3, jun 1994.
- [10] M. J. Ferguson, "SDL and the standardisation of the radio link protocol," in *Workshop: Formal methods in Telecommunications Applied to Open Switching*, (Aachen, Germany), nov 1994.
- [11] M. J. Ferguson, "A state-space approach to the analysis of high speed multiple access protocols: DQDB," in *Colloque Jacques Cartier: Communicating Informatics and Distributed System*, (Grenoble, France), nov 1994.
- [12] M. J. Ferguson, "Validation of the radio link protocol," Contribution TR45.3.2.5/93.08.25.02, Data Services Task Group of ANSI Accredited TIA TR45-3, sep 1993.
- [13] H. Erdogmus, M. J. Ferguson, and R. Johnston, "Weak processes and laws of nondetrminism and divergence," in *Eighth International Symposium on Computer and Information Sciences*, (Istanbul, Turkey), nov 1993.
- [14] M. J. Ferguson, "A study of unslotted aloha with arbitrary message lengths," in *Multiple Access Communications: Foundations for Emerging Technologies* (N. Abramson, ed.), pp. 5: 20–25, IEEE Press, 1993.
- [15] M. J. Ferguson, "An overload cycle analysis of generalized bandwidth balancing with strict priority enforcement," in *Fifth IEEE Workshop on Metropolitan Area Networks*, (Taormina, Italy), may 1992.
- [16] M. J. Ferguson, "An overload cycle analysis of generalized bandwidth balancing for DQDB," in *Infocom'92*, (Florence, Italy), may 1992.
- [17] A. Jalali-Nadoushan and M. J. Ferguson, "Computationally efficient algorithms for on-line optimization of markov decision processes," *Automatica*, jan 1992.
- [18] A. Jalali-Nadoushan and M. J. Ferguson, "On distributed dynamic programming," *IEEE Transactions on Automatic Control*, nov 1991.

- [19] A. Jalali-Nadoushan and M. J. Ferguson, “Asynchronous adaptive control of markov chains,” *Systems and Control Letters*, pp. 209–218, 1990.
- [20] A. Jalali-Nadoushan and M. J. Ferguson, “A distributed asynchronous algorithm for expected average cost dynamic programming,” in *29<sup>th</sup> IEEE Conference on Decision and Control*, (Honolulu, Hawaii), dec 1990.
- [21] A. Jalali-Nadoushan and M. J. Ferguson, “Adaptive control of a class of non-identifiable markov chains,” in *29<sup>th</sup> IEEE Conference on Decision and Control*, (Honolulu, Hawaii), dec 1990.
- [22] M. J. Ferguson, “A state space characterization of DQDB,” in *Fourth IEEE Workshop on Metropolitan Area Networks*, (Fort Myers, Florida), nov 1990.
- [23] M. J. Ferguson, “Towards a formal model for IEEE802.6,” in *Architecture and performance issues of high-capacity local and metropolitan area networks* (G. Pujolle, ed.), (Sophia Antipolis, France), NATO/OTAN, jun 1990.
- [24] A. Jalali-Nadoushan and M. J. Ferguson, “Computationally efficient adaptive control algorithms for markov chains,” in *28<sup>th</sup> IEEE Conference on Decision and Control*, (Tampa, Florida), dec 1989.
- [25] M. J. Ferguson, “L’incorporation de graphiques dans INRST<sub>E</sub>X,” in *Les Cahiers GUTenberg*, (Paris, France), pp. 81–89, may 1989.
- [26] M. J. Ferguson, “MLT<sub>E</sub>X is multilingual,” in *Proceedings Ninth Annual Meeting, T<sub>E</sub>X Users Group*, (Montréal, Canada), pp. 179–187, aug 1988.
- [27] M. J. Ferguson, “INRST<sub>E</sub>X: a document preparation system for multiple languages,” in *T<sub>E</sub>X for Scientific Documentation, Second European Conference*, (Strasbourg, France), pp. 74–88, jun 1986.
- [28] M. J. Ferguson, “A multilingual MLT<sub>E</sub>X,” in *T<sub>E</sub>X for Scientific Documentation, Second European Conference*, (Strasbourg, France), pp. 65–73, jun 1986.
- [29] M. J. Ferguson, “Computation of the variance of the waiting time for token rings,” *IEEE Journal on Selected Areas in Communications*, sep 1986.
- [30] M. J. Ferguson, “Mean waiting time for a token ring with nodal dependent overhead,” *Advances in Telecommunication*, 1986.
- [31] M. J. Ferguson and Y. Aminetzah, “Exact results for non-symmetric token ring systems,” *IEEE Trans. on Communications*, vol. COM-33, pp. 223–231, mar 1985.
- [32] M. J. Ferguson, “Mean waiting time for a token ring with nodal dependent overheads,” in *International Telecommunications Conference, ITC-11*, (Kyoto, Japan), sep 1985.
- [33] M. J. Ferguson, “INRST<sub>E</sub>X in a multilingual environment,” in *Proceedings Sixth Annual Meeting, T<sub>E</sub>X Users Group*, (Stanford, Calif.), aug 1986.

- [34] M. J. Ferguson and L. Mason, "Network design for a large class of teleconferencing system," *IEEE Trans. on Communications*, vol. COM-32, pp. 789–796, mar 1984.
- [35] M. J. Ferguson, "Multiaccess in a non-queueing mailbox environment," *IEEE Journal on Software Engineering*, vol. SE-10, pp. 237–243, may 1984.
- [36] M. J. Ferguson and M. Kaplan, "An information-theoretic view of some practical source-coding problems," in *IEEE International Symposium on Circuits and Systems (ISCAS 84)*, (Montréal, Canada), pp. S1.1: 1–5, may 1984.
- [37] M. J. Ferguson, "Weighted processor sharing: Results for hyperexponential servers," *IEEE Journal on Software Engineering*, vol. SE-9, pp. 635–639, jul 1983.
- [38] M. J. Ferguson, "Global sequencing of messages on a ring," in *Eleventh Biennial Symposium on Communications*, (Queens University, Kingston, Canada), pp. A3: 10–11, jun 1982.
- [39] M. J. Ferguson, "An introduction to the reference model for open systems architecture," in *Pacific Telecommunications Conference*, (Honolulu, Hawaii), pp. 2G: 11–19, jan 1980.
- [40] M. J. Ferguson, "An approximate analysis of delay for fixed and variable length packets in an unslotted aloha channel," *IEEE Trans. on Communications*, vol. COM-25, pp. 644–654, jul 1977.
- [41] M. J. Ferguson, "A bound and approximation of delay distribution for fixed-length packets in an unslotted aloha channel and a comparison with time division multiplexing (tdm)," *IEEE Trans. on Communications*, vol. COM-25, pp. 136–139, jan 1977.
- [42] M. J. Ferguson, "Diffuse rate  $1/2$  threshold decodable codes (correction)," *IEEE Trans. on Information Theory*, vol. IT-22, p. 320, may 1976.
- [43] D. Haccoun and M. J. Ferguson, "Generalized stack algorithms for decoding convolutional codes," *IEEE Trans. on Information Theory*, vol. IT-21, pp. 638–650, nov 1975.
- [44] M. J. Ferguson, "On the control, stability, and waiting time in a slotted random access system," *IEEE Trans. on Communications*, vol. COM-23, pp. 1306–1311, nov 1975.
- [45] M. J. Ferguson, "A study of unslotted aloha with arbitrary message lengths," in *IEEE Fourth Data Communications Symposium*, (Québec, Canada), pp. 5: 20–25, oct 1975.
- [46] M. J. Ferguson, "On the control, stability and waiting time in a slotted aloha random access system," in *ICC'75*, (San Francisco, Calif.), p. III: 45.6, jun 1975.
- [47] D. Elias and M. J. Ferguson, "Topological design of multipoint teleprocessing networks," *IEEE Trans. on Communications*, vol. COM-22, pp. 1753–1761, nov 1974.
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- [50] M. J. Ferguson, "Optimal reception for binary partial response channels," *Bell System Technical Journal*, vol. Vol. 51, pp. 493–505, feb 1972.
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- [53] M. J. Ferguson, "Communication at low data rates -spectral analysis receiver," *IEEE Trans. on Communications*, vol. COM-16, pp. 657–668, oct 1968.
- [54] M. J. Ferguson and P. E. Mantey, "Automatic frequency control via digital filtering," *IEEE Trans. on Audio and Electroacoustics*, pp. 657–668, sep 1968.
- [55] M. J. Ferguson, "Communication at low data rates – oscillator models and corresponding optimal receivers," *IEEE Trans. on Communications*, vol. COM-16, pp. 392–397, sep 1968.
- [56] M. J. Ferguson, "Optimal signal design for sequential signalling over a channel with feedback," *IEEE Trans. on Information Theory*, vol. IT-14, pp. 331–339, mar 1968.