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EDUCATION

Doctor of Philosophy in Electrical Engineering

Graduate School and University Center, CUNY, New York, NY - December 1998
Thesis Topic: Detailed Dynamic Performance Analysis and Feasibility Assessment of Emerging Optical Switching and its Impact on the Performance of a Fully Reconfigurable WDM Transport Network.

Master of Engineering in Electrical Engineering

The City College of New York, New York, NY

Bachelor of Engineering in Electrical Engineering

The City College of New York, New York, NY
Summa Cum Laude

WORK EXPERIENCE

CURRENT

The City University of New York
College of Staten Island, Staten Island, NY
Engineering Science and Physics Department,
Associate Professor
September 2008-present

Research focuses on analysis, modeling and design/engineering in the following areas: WDM optical communication systems and networks for metro, access and avionics applications, integration of wired/wireless networks, wireless ad hoc networks, speech recognition, signal processing and cross-layer integration of communication networks. Research involves developing simulation models, framework, tools and experimental testbeds for the above research applications.
Teaches undergraduate courses in Electrical Engineering.

PREVIOUS – INDUSTRIAL

RSoft Design Group, Ossining, NY
Manger, OptSim System Simulation Framework Development

OptSim is an object oriented modeling and simulation tool that is widely used to model and simulate optical systems and networks. Responsibilities included:

- Developed several simulation algorithms and models for WDM systems design based on the wavelength-domain simulation approach.
- Integrated the wavelength-domain and the time-domain simulation techniques into the OptSim framework.
- Developed several models for investigation of WDM LAN in aerospace platforms
- Lead developer of software platform with extensive use of Java, XML and C++ computer programming languages.

Network Design Tools Inc, Eatontown, NJ
Director, System Simulation Tools (co-founder)

- In charge of a small team of researchers/developers working on a simulation framework for optical networks.
- Developed models of optical components and optical systems to go into the new framework.

Telcordia Technologies (formerly Bellcore), Red Bank, NJ
Research Scientist
Optical Networking Group

Worked on the multi-company government funded consortium project: Multiwavelength Optical Network (MONET). Tasks included:

- Performed simulation and experimental work to deepen the understanding of WDM networks.
- Developed new modeling and simulation techniques for the study of transients in WDM optical networks.
- Conducted operational testing of the MONET network in Washington DC.
- Developed models to aid in the understanding and engineering of compatibility between different optical amplifier designs in the MONET project.
- Served as Telcordia's technical lead in the NIST sponsored Photonic Computer Aided Design (PCAD) project. The objective of this project was to develop tools to reduce cost and improve the reliability of optical components and optical systems designs.

Bell Communications Research (currently Telcordia Technologies)
Full-time Resident Research Visitor

Conducted my doctoral research at Bellcore. Responsibilities included:

- Studied experimentally and through detailed modeling and simulations the fixed gain EDFAs implemented in the ROADM network elements used in the Telcordia Technologies MONET testbed.
- Performed optical and reliability characterization of the Liquid Crystal cross-connects used in the local exchange testbed at Telcordia Technologies.
- Developed models and performed simulation of the transient behavior of different protection switching mechanism in WDM ring networks.
- Simulated wide-band (C-band and L-band) EDFA configurations with gain flattening filters to allow for long cascades of amplifiers in WDM point-to-point systems.

AT&T Bell Laboratories/Lucent Technologies
Summer Intern

- Developed a software application with the goal of refining data acquisition for VLSI technology.

Jamaica Broadcasting Corporation, Kingston, Jamaica
Radio Technician

- Installed and maintained AM and FM radio transmitters.

Involved in research, design, engineering and construction of one of the world's first high bandwidth WDM/SONET computer metro ring lab prototypes in Red Bank, NJ and later on an actual network

implementation in the Washington, DC metro area. Work was sponsored by a multi-company government-funded consortium called: Multiwavelength Optical NETWORKING (MONET) consortium. Responsibilities included:

- Studying performance issues of Wavelength Division Multiplexing (WDM) optical networks concentrating on the NJ MONET local exchange testbed and extending to the MONET Washington, D.C field network.
- Modeling the behavior of Erbium Doped Fiber Amplifiers used in the above metro ring networks.
- Deriving the specs for a number of prototype optical components such as optical switches, optical filters, fibers etc.
- Developed an efficient wavelength-domain simulation tool that was used to:
 - Design WDM network elements.
 - Evaluate transmission impairments and end-to-end performance of various network architectures.
 - Provide guidelines for network optimization.
 - Support international standards contributions.
- Extensive studies on optical protection switching, switching times, component redundancy, and optical transient effects.
- Hands-on experience on the construction of the metro laboratory network testbed including optical measurements for model validation and simulation tool calibration.

RECENT FUNDING

1) NAVAIR, “Advanced WDM Fiber-Optic Network Architecture Analysis, Modeling, Optimization and Demonstration for Aerospace Platforms” Total - PI, \$786,106, Duration: 06/2006-06/2008.

PROFESSIONAL ACTIVITIES

SOCIETIES – REVIEWER - COMMITTEE

- Member of the Institute of Electrical and Electronics Engineers (IEEE)
- Member of Lasers and Electro-Optics Society (LEOS)
- Member of Communications Society (COMSOC)

PUBLICATIONS

REFEREED ARTICLES

1. “Wavelength-Domain Simulation of Multiwavelength Optical Networks,” Invited Article, IEEE J. Selected Topics in Quantum Electronics – Special Issue on Modeling of High Data Rate Optical Fiber Communication Systems, vol. 6, no. 2, I. Roudas, N. Antoniadis, D. H. Richards, R. E. Wagner, J. L. Jackel, S. F. Habiby, T. E. Stern, and A. F. Elrefaie, March/April 2000.
2. “An Efficient Simulation Model of the Erbium-Doped Fiber for the Study of Multiwavelength Optical Networks”, Invited Article, Optical Fiber Technology, v. 5, pp. 363-389, I. Roudas, D. H. Richards, N. Antoniadis, J. L. Jackel, and R. E. Wagner, October, 1999.
3. “Multichannel EDFA Chain Control: A Comparison of Two All-Optical Approaches,” D. H. Richards, J. L. Jackel, and M. A. Ali, IEEE Photonics Technology Letters, vol. 10, no. 1, January 1998.
4. “A Theoretical Investigation of Dynamic All-Optical Automatic Gain Control in Multichannel EDFAs and EDFA Cascades,” D. H. Richards, J. L. Jackel, and M. Ali, IEEE Journal of Selected Topics in Quantum Electronics, vol. 3, no. 4, August 1997.
5. “Use of Wavelength-and Time-Domain Simulation to Study Performance Degradation due to Linear Optical Crosstalk in WDM Networks,” N. Antoniadis, I. Roudas, R. E. Wagner, T. E. Stern, J. L. Jackel, and D. H. Richards, OSA Trends in Optics and Photonics, TOPS vol. 20, pp. 288-293, 1998.

6. "All-Optical Stabilization of Cascaded Multi-wavelength Erbium-doped Fiber Amplifiers with Changing Numbers of Channels," J. L. Jackel, and D. H. Richards, *OSA Trends in Optics and Photonics*, vol. 12, System Technologies (Optical Society of America, Washington, DC, 1997)

REFEREED PROCEEDINGS

7. "Physical Layer Modeling of Passive Optical Networks," J. K. Patel, D. H. Richards, E. Ghillino, P. V. Mena, A. Panicker, and Z. Huang, Invited Paper, APOC'2007, Wuhan, China.
8. "Advanced Compact Transient Modeling of Er-Doped Amplifiers for Avionic Fiber-Optic Systems," Pablo V. Mena and Dwight Richards, Avionics Fiber Optics Conference, Oct. 2007, Victoria, BC, Canada.
9. "Network Layer Modeling of WDM Fiber Optic Network Architectures for Aerospace Platforms," Henrik N. Poulsen, Dwight H. Richards, Anil Ramapanicker, and Daniel J. Blumenthal, Avionics Fiber Optics Conference, Oct. 2007, Victoria, BC, Canada.
10. "Modeling and Simulation of WDM Fiber Optic Network Architectures for Aerospace Platforms," B. K. Whitlock, H. N. Poulsen, D. H. Richards, D. Blumenthal, Avionics Fiber Optics Conference, Sept. 2006, Annapolis, MD.
11. "System simulation tools for POF-based systems", POF Day Symposium, OFC/NFOEC'2006, Anaheim, P. V. Mena, G. Shaulov, J. Morikuni, E. Heller, H. Rao, E. Ghillino, D. H. Richards, B. K. Whitlock, J. Patel, M. J. Steel, N. Stoffel, R. Scarmozzino March 2006
12. "Comprehensive Design Optimization of the Physical Layer of Optical Networks," B. K. Whitlock, D. H. Richards, N. Stoffel, E. Ghillino, H. Korada, P. V. Mena, G. Shaulov, J. J. Morikuni, and R. Scarmozzino, OFC/NFOEC'2005 Technical Proceedings, Anaheim, CA.
13. "SimWORKS, A Hybrid Java/C++ Simulation Platform," N. Stoffel, D. Richards, K. Thangaiah, H. Korada, R. Scarmozzino, and B. Whitlock, Ptolemy Conference, May 9, 2003, University of California at Berkeley, CA.
14. "A Platform for Executing Ptolemy Classic Models Under the Control of Ptolemy II," Ned Stoffel, Dwight Richards, Karthikeyan Thangaiah, and Kalpesh Patel, Ptolemy Conference, June 8, 2001, University of California at Berkeley, CA.
15. "Advances in Optical Network Modeling," D. H. Richards, J. L. Jackel, N. Smyth, M. Goodman, and W. T. Anderson, Invited Paper, LEOS'2000, MK1, Puerto Rico.
16. "Modeling and Simulation Issues with 10-Gigabit Ethernet," Brent Whitlock, D. H. Richards, Invited Paper, LEOS'2000, TuBB3, Puerto Rico.
17. "Design of Optical Networks: Simulation and Validation within MONET DC Network," D. H. Richards, J. L. Jackel, N. Smyth, M. Goodman, and W. T. Anderson, NFOEC'2000 Technical Proceedings, pp. 437-443, Denver CO.
18. "Optical Network Simulation and the MONET DC Network," D. H. Richards, J. L. Jackel, N. Smyth, M. Goodman, and W. T. Anderson, Invited Article, Integrated Photonics Research, IPR'2000, JWA3-1, Quebec, Canada.
19. "Wavelength-Domain Simulation: An Efficient Technique for the Study of the Transport Layer in Multiwavelength Optical Networks," I. Roudas, N. Antoniadis, D. H. Richards, J. L. Jackel, and R. E. Wagner, Invited Article, Integrated Photonics Research Topical Meeting, IPR'99, RTuJ2, Santa Barbara, CA, Jul. 1999.
20. "Transient Effects in Wavelength Add-Drop Multiplexer Chains," I. Roudas, J. L. Jackel, D. H. Richards, N. Antoniadis, and J. E. Baran, OFC'99, TuR2, Feb. 1999, San Diego, CA.
21. "Method for Detecting Fiber Cuts in a WDM Ring with Saturated EDFAs," D. H. Richards, J. L. Jackel, I. Roudas, W. Xin, N. Antoniadis, and M. Ali, OFC'99, FJ4, Feb. 1999, San Diego, CA.

22. "Optical Simulation for Experimental Networks: Lessons from MONET," D. H. Richards, J. Jackel, M. Goodman, I. Roudas, R. Wagner, and N. Antoniadis, Invited Paper, Proceedings of SPIE, Sep. 1999, Boston MA.
23. "Compatibility of Gain-Stabilized EDFAs: A Simulation Study," D. H. Richards, J. L. Jackel, N. Smyth, M. Goodman, and W. T. Anderson., In Proceeding of LEOS'99
24. "Detecting Fiber Cuts in a WDM Ring with Optical Protection Switching: Simulation and Experiment," D. Richards, J. Jackel, N. Antoniadis, I. Roudas, W. Xin, and M. Ali, ECOC'98, Madrid, Spain, September, 1998.
25. "Evaluating the Reach of Multiwavelength Optical Networks," N. Antoniadis, I. Roudas, R. E. Wagner, T. E. Stern, J. L. Jackel, and D. H. Richards, LEOS'98 WR1, Orlando, FL. Dec. 1998.
26. "A Theoretical Investigation of Dynamic Automatic Gain Control in Multi-Channel EDFA Cascades," D. H. Richards, M. A. Ali, and J. L. Jackel, ECOC'97, Edinburgh, UK, September, 1997.
27. "EDFA Chain Control: A Comparison of Two Approaches," D. H. Richards, M. A. Ali, and J. L. Jackel, In Proc. LEOS'97, Montreal, Quebec, Aug. 1997, Paper FB2.
28. "All-Optical Stabilization of Multiwavelength EDFA Chains: A Network Level Approach," J. L. Jackel, and D. H. Richards, In Proc. LEOS'96, Boston, MA, Nov. 1996, post deadline paper 2.2.

8. OTHER PUBLICATION

CHAPTER IN BOOKS

- [1] R. Scarmozzino, E. Heller, M. Steel, M. Bahl, M. Jiang, E. Ghillino, J. Patel, D. Richards, P. Mena, A. Ramapanicker, "Simulation Tools for Devices, Systems, and Networks", Chapter 20 of book entitled "Optical Fiber Telecommunications B: Systems and Networks", by Ivan P. Kaminow, Tingye Li, and Alan E. Willner, ISBN 9780123741721, Academic Press, Published 2008. (section 20.3.1 Single-Mode Systems by D. Richards)

PATENTS

- [1]. Method and System for Detecting Loss of Signal in WDM Systems, U.S patent # 6,115,154.

LECTURES AND PAPERS PRESENTED

- [1] Talk "Advanced Compact Transient Modeling of Er-Doped Amplifiers for Avionic Fiber-Optic Systems," Avionics Fiber Optics Conference, Oct. 2007, Victoria, BC, Canada.
- [2] Talk "Modeling and Simulation of WDM Fiber Optic Network Architectures for Aerospace Platforms," Avionics Fiber Optics Conference, Sept. 2006, Annapolis, MD.
- [3] Talk "Advances in Optical Network Modeling," Invited Paper, LEOS'2000, MK1, Puerto Rico.
- [4] Talk "Design of Optical Networks: Simulation and Validation within MONET DC Network," NFOEC'2000 Technical Proceedings, pp. 437-443, Denver CO.
- [5] Talk "Optical Network Simulation and the MONET DC Network," Invited Article, Integrated Photonics Research, IPR'2000, JWA3-1, Quebec, Canada.
- [6] Talk "Method for Detecting Fiber Cuts in a WDM Ring with Saturated EDFAs," OFC'99, FJ4, Feb. 1999, San Diego, CA.
- [7] Talk "Optical Simulation for Experimental Networks: Lessons from MONET," Invited Paper, Proceedings of SPIE, Sep. 1999, Boston MA.

[8] Talk “Detecting Fiber Cuts in a WDM Ring with Optical Protection Switching: Simulation and Experiment,” ECOC’98, Madrid, Spain, September, 1998.

[9] Talk “EDFA Chain Control: A Comparison of Two Approaches,” LEOS’97, Montreal, Quebec, Aug. 1997, Paper FB2.