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Prof. Lakshman Tamil

... is currently the cheer leader of UTD's Quality of Life Technology Laboratory. Over the course of his career he has contributed to more than 100 research publications and 18 patents and has directed more than a dozen doctoral dissertations. Previously, Dr. Tamil was the Founder, CEO and CTO of Yotta Networks Inc., which designed and marketed terabit-switching platforms. He has also directed research on advanced optical networks at Alcatel's Corporate Research Center, and he was a leader in creating both the optical IP router and a multichannel, multipoint distribution service that was a precursor to WiMAX. He has been an optical and wireless communication consultant to the Naval Research Laboratories, Raytheon Co., Electrospace Systems Inc. and others.

Research Summary

Dr. Tamil's current research is in the area of **Quality of Life Technology**. He works collaboratively with an interdisciplinary team of engineers, computer scientists, statisticians, physicians and nurses at the UTD's Quality of Life Technology Laboratory. Their current focus is on telemedicine, cognitive support tools for healthcare, sleep apnea and sleep quality assessment and smartbed.

Dr. Tamil's earlier research areas include optical switching and routing, optical transmission and networks, wireless communication, inverse problems in electromagentics, and solitons in nonlinear fibers.

Current Research

- **Telemedicine**: Second generation telemedicine platform capable of providing anywhere and anytime access to healthcare is under development. A privacy respecting system with high security, reliability and ease of use are some the salient features of the system developed.
- **Disposable ECG**: Developing a disposable ECG. The ECG device is capable of automatic arrhythmia detection and is easy to wear.
- **Cognitive Support for Medical Diagnosis and Treatment**: Addressing fundamental issues in developing cognitive support system capable of providing support to healthcare personnel in diagnosis and treatment.
- **Sleep Apnea**: A simpler one-lead ECG based sleep apnea monitor with automated apnea epoch identification based on a sophisticated machine learning algorithms has been developed and tested. This device provides high performance accuracy when tested on apnea databases and is getting ready for patient trial.
- **Smart Bed**: Pressure ulcer is a serious problem when a patient stays longer in bed, whether it is in a hospital, or at home. We are working on a prototype that can detect pressure ulcers as wells as react to prevent ulcers.
- **Optical Switching and Routing**: Developed and demonstrated a hybrid optical router capable of graceful scaling to multi-terabits/s capacity at Yotta Networks, Inc. Also, led the system architecture and the development of Alcatel's first Terabit IP Optical Router (TIPOR).

Past Research

- **Optical Transmission and Networks**: Addressed dispersion compensation and Erbium Doped Fiber Amplifier (EDFA) placement in transmission networks.
- **Wireless Communication**: Developed an Multi-channel Multi-point Distribution Service (MMDS) system in collaboration with Mr. Aubrey Chapman. The patented system was developed and marketed by Spike Technologies. MMDS is the precursor to IEEE 802.16 Wi-Max Technology.
- **Soliton in Fiberoptics**: Investigated generation and transmission of 'Bright Soliton' and 'Gap soliton' in nonlinear optical waveguides.
- **Inverse Problems in Electromagnetics**: One of the early investigators of the field of synthesizing optical waveguides with prescribed transmission properties using inverse scattering techniques. Developed both analytical and numerical techniques.

Recent Publications

- *A. Saeed, M. Faezipour, M. Nourani, G. Lee, G. Gopal and L. Tamil, "A scalable wireless body area network for bio-telemetry," J. Information Processing Systems*

vol.5, no. 2, pp.77-86, June 2009. [pdf]

- M. Bsoul, H. Minn, M. Nourani, G. Gupta, W. Brock and L. Tamil, "Apnea MedAssist: A Personalized Low-cost Sleep Apnea Monitor," First IEEE-AMA Medical Technology Conference on Individualized Healthcare, March 21-23, 2010, Washington, DC. [pdf]

- L.S. Tamil, "Pervasive health care and healthcare technologies" IEEE ICME 2009 Workshop-Multimedia Aspects in Pervasive Healthcare, July 3, 2009, New york, NY. (Invited paper) [slide-show]