Curriculum Vitae

Dr. Leonard J. Forys

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Education

1959 - 1963 **U. of Notre Dame**
Notre Dame, Indiana
B.S. in Electrical Engineering

1963 - 1965 **Massachusetts Institute of Technology**
Cambridge, Massachusetts
S.M. and E.E. in Electrical Engineering

1965 - 1968 **U. of California**
Berkeley, California
Ph.D. in Electrical Engineering and Computer Science

Employment

1967 - 1968 **U. of California**
Berkeley, California
Assistant Professor of Electrical Engineering and Computer Science

1968 - 1973 **Bell Telephone Laboratories**
Holmdel, NJ
Member of Technical Staff

1973 - 1984 **Bell Telephone Laboratories**
Holmdel, NJ
Technical Supervisor

1984- 1994 **Bell Communications Research**
Red Bank, NJ
District Manager

Spring 1989 **U. of Adelaide**
Adelaide, Australia
Invited Professor of Applied Mathematics

1994 - 1995

Bell Communications Research
Red Bank, NJ
Chief Scientist

1995 – present

The Forys Consulting Group Inc. (EIN 22-3369136)
Holmdel, NJ
President

2000- present

ISC
Algorithm specialist

Awards received

1974

Eta Kappa Nu
Runner-up: *Outstanding Young Electrical Engineer (USA) of the Year Award*

1988

Bell Communications Research
Red Bank, NJ
Award of Excellence

1992

Bell Communications Research
Red Bank, NJ
Bellcore Fellow (*5th to receive this award)*

Functional summary

Low Speed Data

Technical Analyses, Generic Requirements, Traffic Engineering

I led the Bellcore effort to test and analyze a number of ISDN data applications on #5ESS, DMS 100F and Siemens EWSD. I also analyzed various network elements in X.25 packet networks including products from Siemens, NTI and BBN. Had prime responsibility for traffic, network management and performance sections of Bellcore's Packet Switch Generic Requirements documents. I developed algorithms to design low speed packet networks, which resulted in prototype software. I developed a fundamental new methodology to service packet networks using simple measurements of burstiness.

High Speed Data

Data Traffic Characterization, ATM traffic engineering

I headed the Bellcore effort to demonstrate inadequacy of current traffic models for engineering of high-speed data and other ATM applications. One of the main areas of application was Internet traffic engineering. Was responsible for developing alternative, fractal and self-similar, traffic models which can accurately predict effects of actual high-speed data traffic on system performance. I developed a world-leadership position in developing ATM traffic engineering methodologies. I proposed and modified several Bellcore generic requirements for local access technologies.

Intelligent Network

Network Integrity Analysis

I was Bellcore's prime technical leader for determining root causes and proposing solutions in several SS7 outages including the 1990 ATT outage and the 1991 DSC STP outages. I had responsibility for the performance and robustness testing of several key Intelligent Network elements and their network management protocols. These included most of the SSPs and STPs used by the RBOCs and two SCPs.

IN Requirements

I was responsible for refining the performance requirements for Intelligent Network elements and end-to-end objectives. Part of this responsibility included the development of mathematical models of AIN performance. This resulted in identification of several problems in the existing SS7 protocols and the performance impacts of a number of proposed solutions were quantified.

PCS & IN Architectures

I had responsibility for determining the impacts of various architectures on PCS (cellular) performance. This included the placement of AIN triggers in switch configurations, various PCS architectures and their performance characteristics, and the real time impacts of selecting protocol parameters for key AIN features such as automatic-call-back.

Technical Analyses

Switch Analysis

I analyzed (and tested) traffic engineering algorithms, traffic performance during normal and overload conditions, and the adequacy of traffic measurements for a number of voice switches. Special emphasis was put on real-time capacities of processors. These switches included: AT&T's Nos. 1/1A, 2, 4 and 5 ESS; DCT, Dimension PBX and VMS; NTI's DMS 100F including the SuperNode SE, DMS 200, TOPS and QMS; Siemens' EWSD; Ericsson's AXE; DSC's Megahub; Rockwell's DCD and parts of others. I was first to quantify effects of non-stationary and non-Poisson traffic on SPC switch performance.

Switch Requirements

Network Management, Capacity, Traffic, and Overload Requirements

I was responsible for developing and maintaining several sections of Bellcore's Local Switching Systems Generic Requirements (LSSGR) including sections on switch capacity estimation, traffic engineering, overload performance, traffic measurements and essential service protection. I invented the Last- In-First-Out (LIFO) overload strategy used in most modern switches in the US market and required by the LSSGR. I discovered the "traffic synchronization" effect, which can produce undesirable chaotic behavior in switches, and I developed an easily implementable solution. I was part of team that wrote the original requirements for the #5ESS.

Operator Services

Forcing and Facilities Algorithms

I had prime responsibility for over 15 years for developing and maintaining all call center force staffing algorithms for the pre-divestiture AT&T and later for the Bell Operating Companies. I also had prime responsibility for facilities engineering issues (see above under Switch Analysis). I was a key supporter of the economic introduction of new technologies into call centers. I am currently an algorithm specialist for ISC, a company who makes call center staffing software.

Network Vulnerability

Overload and Outage Analyses, Priority Traffic, Network Management

I was prime technical contributor to National Emergency Telecommunications System (NETS) study that characterized the impacts of various network outage scenarios on local switch performance. Proposed priority algorithms and quantified their effects in mitigating service impacts on high-priority users. I was sponsored by the NSF to represent the US telecommunications industry at a joint US-Japan earthquake symposium. I analyzed the impacts of earthquakes on local exchange service.

Voice Networks

Traffic Forecasting, Private network analysis, Faulty trunk analysis, Video on Demand

I pioneered the introduction of Kalman filtering techniques for traffic forecasting. Analyzed, and resolved, chronic trouble conditions in private networks which included both voice and data. I analyzed trunk termination problems in switching system, as well as network engineering and design. I pioneered the performance analysis of faulty telecommunications trunks having short, but ineffective, holding times. I analyzed several alternatives for providing video on demand services.

Voice Mail Systems

Analysis of V-Mail Systems, traffic engineering, switch impact

I analyzed (and tested) the traffic handling capabilities of several voice mail platforms and analyzed their engineering algorithms. I determined appropriate engineering loading levels for switch access. I determined switch capabilities and SMDI link limitations for various products.

Communication and Control Theory

Aerospace Applications, Satellite Communications, Air Traffic Control

I developed optimum algorithms for an infrared tracking system, and optimal detection of initial positions of dynamic objects. I determined optimum radar pulse allocation algorithm, and bounds on transmission rate performance through unknown channels. I analyzed the performance of UPCM coding system. I applied Kalman Filtering algorithms to predict traffic in telecommunications satellite application. I developed models and a validation methodology for air traffic control management system.

Teaching

University Courses, In-Hours Courses, Outside Short Courses

I developed and taught advanced undergraduate courses in circuit theory, system theory and communications theory. I developed and taught graduate university courses in Teletraffic Models; one emphasizing theory for Ph.D. students, the other emphasizing applications for industry students. I developed and taught several in-hours courses at Bell Labs and Bellcore: Linear Discrete-Time Filtering Theory, Congestion Theory, Advanced Traffic Theory, Real Time Capacity Estimation and Computer Performance Analysis. I also developed and taught short (1-2 day) courses for industry, including the FCC: Introduction to Traffic Engineering.

Publications and Professional Activities

I have contributed extensively to various journals and conferences. I was session chairman at variety of conferences. I have over 38 external publications and talks. I was a reviewer for several technical journals and conferences. I also was a large grant reviewer for the Australian Research Council.

Consulting Activities 6/1995-1/2015 (30+ worldwide clients)

Internet Impact	Analyzed the impacts of Internet access for a major telecommunications carrier. .
Internet Access	Analyzed the effects of local switch switching architectures on Internet access.
ADSL Performance	Developed approaches to quantify the performance of various bandwidth-sharing algorithms for ADSL
Hybrid Fiber/Coax	Analyzed (and optimized) the traffic engineering methods provided by three major suppliers of hybrid fiber/coax networks. Analyzed network and switching costs for a voice over cable proposal for an international supplier.
Satellite Communications	Analyzed performance, provided traffic inputs, and helped specify traffic network management/ congestion controls for three packetized voice and data satellite communications systems and analyzed impacts of web caching for a fourth system
Quality of Service	Established quality of service metrics for large packet switched network on behalf of a major telecommunications carrier.
ATM Buffer Design	Analyzed optimal buffer designs for major Asynchronous Transfer Mode (ATM) data switch supplier.
ATM CAC	Assessed the effectiveness and efficiency of several suppliers' ATM Call Admission Controls. Developed CAC algorithms that account for self-similar data traffic, as well as other applications.
ATM Signaling	Investigated merits of using ATM Variable Bit Rate data services to handle associative broadband signaling.
IN and LNP	Analyzed various Intelligent Network Local Number Portability implementations for a large telecommunications supplier.
IN Interconnection	Wrote a white paper for an Asian regulatory commission analyzing the issues involved in network interconnection, both trunking and Intelligent Network SS7.
IN Advisor	On behalf of the European Commission, served as an advisor on a Intelligent Network research project.
Switch Analysis	As part of a team of 4 internationally recognized experts, conducted an analysis of nearly all aspects of a modern digital switch in a competitive environment including network management and operational issues.
Switch Operations	**A**nalyzed the success of a major system provider in integrating a new switching system into its daily operations/network management systems.
Switch Performance	Resolved capacity and performance problems experienced by a CLEC with a modern digital switch.
Capability Assessment	Analyzed the capabilities of an emerging switching product on behalf of a large potential investor.

DOCKET ALARM

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Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

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Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

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Automate many repetitive legal tasks like conflict checks, document management, and marketing.

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Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.