

## BIOGRAPHICAL SKETCH

Ljiljana Trajkovic received the Dipl. Ing. degree from University of Pristina, Yugoslavia, in 1974, the M.Sc. degrees in electrical engineering and computer engineering from Syracuse University, Syracuse, NY, in 1979 and 1981, respectively, and the Ph.D. degree in electrical engineering from University of California at Los Angeles, in 1986.

She is currently a Professor in the School of Engineering Science at Simon Fraser University, Burnaby, British Columbia, Canada. From 1995 to 1997, she was a National Science Foundation (NSF) Visiting Professor in the Electrical Engineering and Computer Sciences Department, University of California, Berkeley. She was a Research Scientist at Bell Communications Research, Morristown, NJ, from 1990 to 1997, and a Member of the Technical Staff at AT&T Bell Laboratories, Murray Hill, NJ, from 1988 to 1990. Her research interests include high-performance communication networks, control of communication systems, computer-aided circuit analysis and design, and theory of nonlinear circuits and dynamical systems.

Dr. Trajkovic serves as IEEE Division X Delegate/Director (2019–2020) and served as IEEE Division X Delegate-Elect/Director-Elect (2018). She served as Senior Past President (2018–2019), Junior Past President (2016–2017), President (2014–2015), President-Elect (2013), Vice President Publications (2012–2013, 2010–2011), Vice President Long-Range Planning and Finance (2008–2009), and a Member at Large of the Board of Governors (2004–2006) of the IEEE Systems, Man, and Cybernetics Society. She served as 2007 President of the IEEE Circuits and Systems Society and a member of its Board of Governors (2004–2005, 2001–2003). She is Chair of the IEEE Circuits and Systems Society joint Chapter of the Vancouver/Victoria Sections. She was Chair of the IEEE Technical Committee on Nonlinear Circuits and Systems (1998). She is General Co-Chair of SMC 2020 and SMC 2020 Workshop on BMI Systems and served as General Co-Chair of SMC 2019 and SMC 2018 Workshops on BMI Systems, SMC 2016, and HPSR 2014, Special Sessions Co-Chair of SMC 2017, Technical Program Chair of SMC 2017 and SMC 2016 Workshops on BMI Systems, Technical Program Co-Chair of ISCAS 2005, and Technical Program Chair and Vice General Co-Chair of ISCAS 2004. She served as an Associate Editor of the IEEE Transactions on Circuits and Systems (Part I) (2004–2005, 1993–1995), the IEEE Transactions on Circuits and Systems (Part II) (2018, 2002–2003, 1999–2001), and the IEEE Circuits and Systems Magazine (2001–2003). She is a Distinguished Lecturer of the IEEE Systems, Man, and Cybernetics Society (2020–2021) and the IEEE Circuits and Systems Society (2010–2011, 2002–2003). She is a Professional Member of IEEE-HKN and a Life Fellow of the IEEE.

## ABSTRACTS OF TWO LECTURES

### COMPLEX NETWORKS

The Internet, social networks, power grids, gene regulatory networks, neuronal systems, food webs, social systems, and networks emanating from augmented and virtual reality platforms are all examples of complex networks. Collection and analysis of data from these networks is essential for their understanding. Traffic traces collected from various deployed communication networks and the Internet have been used to characterize and model network traffic, analyze network topologies, and classify network anomalies. Data mining and statistical analysis of network data have been employed to determine traffic loads, analyze patterns of users' behavior, and predict future network traffic while spectral graph theory has been applied to analyze network topologies and capture historical trends in their development. Machine learning techniques have proved valuable for predicting anomalous traffic behavior and for classifying anomalies and intrusions in communication networks. Applications of these tools help understand the underlying mechanisms that affect behavior, performance, and security of computer networks.

## DATA MINING AND MACHINE LEARNING FOR ANALYSIS OF NETWORK TRAFFIC

Collection and analysis of data from deployed networks is essential for understanding modern communication networks. Data mining and statistical analysis of network data are often employed to determine traffic loads, analyze patterns of users' behavior, and predict future network traffic while various machine learning techniques proved valuable for predicting anomalous traffic behavior. In described case studies, traffic traces collected from various deployed networks and the Internet are used to characterize and model network traffic, analyze Internet topologies, and classify network anomalies.

### RELEVANT RECENT PUBLICATIONS

#### Book chapters:

- Q. Ding, Z. Li, S. Haeri, and Lj. Trajković, "Application of machine learning techniques to detecting anomalies in communication networks: Datasets and Feature Selection Algorithms" in *Cyber Threat Intelligence*, M. Conti, A. Dehghantanha, and T. Dargahi, Eds., Berlin: Springer, pp. 47–70, 2018.
- Z. Li, Q. Ding, S. Haeri, and Lj. Trajković, "Application of machine learning techniques to detecting anomalies in communication networks: Classification Algorithms" in *Cyber Threat Intelligence*, M. Conti, A. Dehghantanha, and T. Dargahi, Eds., Berlin: Springer, pp. 71–92, 2018.

#### Recent conference publications:

- Z. Li, A. L. Gonzalez Rios, and Lj. Trajković, "Detecting Internet worms, ransomware, and blackouts using recurrent neural networks," in *Proc. IEEE Int. Conf. Syst., Man, Cybern.*, Toronto, Canada, Oct. 2020.
- L. Gonzalez Rios, Z. Li, K. Bekshentayeva, and Lj. Trajković, "Detection of denial of service attacks in communication networks," in *Proc. IEEE Int. Symp. Circuits and Systems*, Seville, Spain, Oct. 2020.
- Z. Li, A. L. Gonzalez Rios, G. Xu, and Lj. Trajković, "Machine learning techniques for classifying network anomalies and intrusions," in *Proc. IEEE Int. Symp. Circuits and Systems*, Sapporo, Japan, May 2019.
- L. Gonzalez Rios, Z. Li, G. Xu, A. Dias Alonso, and Lj. Trajković, "Detecting network anomalies and intrusions in communication networks," in *Proc. 23rd IEEE International Conference on Intelligent Engineering Systems 2019*, Gödöllő, Hungary, Apr. 2019, pp. 29–34.
- Z. Li, P. Batta, and Lj. Trajković, "Comparison of machine learning algorithms for detection of network intrusions," in *Proc. IEEE Int. Conf. Syst., Man, Cybern.*, Miyazaki, Japan, Oct. 2018, pp. 4248–4253.
- P. Batta, M. Singh, Z. Li, Q. Ding, and Lj. Trajković, "Evaluation of support vector machine kernels for detecting network anomalies," in *Proc. IEEE Int. Symp. Circuits and Systems*, Florence, Italy, May 2018, pp. 1–4.
- Q. Ding, Z. Li, P. Batta, and Lj. Trajković, "Detecting BGP anomalies using machine learning techniques," in *Proc. IEEE International Conference on Systems, Man, and Cybernetics*, Budapest, Hungary, Oct. 2016, pp. 3352–3355.

### STATEMENT ABOUT AVAILABILITY FOR DELIVERING LECTURES

I plan to honor invitations to deliver Distinguished Lectures subject to my teaching duties at Simon Fraser University. My term as the 2019–2020 IEEE Division X Delegate/Director position ends on December 31, 2020. This will end my commitments to attend the IEEE Technical Activities Board and the IEEE Board of Directors meetings. I have no other long-term commitments to serving IEEE.