

Géza KOLUMBÁN

Fellow of IEEE, IEEE CAS Distinguished Lecturer

Professor of System Engineering

Dr.habil, D.Sc., Ph.D., C.Sc., M.Sc.

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1 Personal information

Surname: Kolumbán
First name: Géza
Sex: male
Nationality: Hungarian
Citizenship: Hungarian
Hungary is a member of European Union and Schengen Zone
Date and place of birth: April 16, 1951, Budapest, Hungary
Present employer: Faculty of Information Technology and Bionics
Pázmány Péter Catholic University
Position held: Full Professor
Address: Práter utca 50/a
H-1083 Budapest
Hungary
Phone numbers: (+36-1) - 8864700 (secretariat)
(+36-1) - 8864754 (direct)
(+36-1) - 2004985 (home)
(+36-70) - 5124490 (mobile)
Fax: (+36-1) - 8864724
E-mail: kolumban@itk.ppke.hu
URL address: <http://users.itk.ppke.hu/~kolumban/>

2 Academic degrees and education

Date	Qualification gained	Institution
2005	Dr.habil	Budapest University of Technology and Economics
2004	Doctor of Technical Science degree in telecommunication (D.Sc.)	Hungarian Academy of Sciences
1994	Ph.D. Degree	Budapest University of Technology and Economics
1990	Candidate of Technical Science degree in circuit theory (C.Sc.)	Hungarian Academy of Sciences
1977	M.Sc. Degree in teaching of technical sciences	Technical University of Budapest
1976	M.Sc. Degree in electrical engineering	Technical University of Budapest

3 Work experience

Date	Employer/Institution	Position
2009-	Pázmány Péter Catholic University	Full Professor, Head of the SDE-VI Lab
1993-2009	Budapest University of Technology and Economics (called Technical University of Budapest before 2000)	Full Professor, Head of the Chaotic Systems Team
1992-1993	Eastern Mediterranean University, Famagusta, Cyprus	Associate Professor
1991-1992	Bilkent University, Ankara, Turkey	Assistant Professor
1983-1991	Research Institute for Telecommunications	Senior Research Fellow, Head of the Frequency Synthesizer Team
1980-1983	Hungarian Academy of Sciences	Holder of scientific scholarship
1976-1980	Fine Mechanical Enterprise	Research Engineer

4 Awards

Date	Award
2003-2006	Széchenyi Scholarship of most outstanding Hungarian University Professors
2002	Siemens Research Award
1999-2002	Széchenyi Scholarship of most outstanding Hungarian University Professors
1986	prize for a published paper
1985	prize for an oral contribution
1984	"Excellent Engineer"
1983	"Excellent Inventor" - golden degree
1978	"Excellent Engineer"

5 Activity in IEEE and other scientific bodies

5.1 IEEE membership

Date	Grade	Citation
2005	Fellow	<i>"for contributions to double sampled phase-locked loops and noncoherent chaotic communications"</i>
1998	Senior Member	
1992	Member	

5.2 IEEE CAS Distinguished Lecturer, 2013-2014

Lectures offered in IEEE CAS DLP framework:

1. Software Defined Electronics: A new research field for IEEE CAS Society
2. A new approach for design and implementation of future communications systems

5.3 IEEE Fellow Society/Technical Council Evaluator (IEEE-CAS Society Fellow Evaluation Committee)

Date	Grade
2009	Member

5.4 Technical Committee on Nonlinear Circuits and Systems (IEEE-CAS Society)

Date	Grade
2000-	Member

5.5 Circuits, Systems and Computers Joint Chapter (CS&C) (IEEE – Hungary Section)

Date	Grade
2006-2015	Chapter Chair

5.6 Other bodies

Date	Institution	Grade or duty
2015-	Beijing Jiaotong University School of Electronic and Information Eng.	Honorary Adviser
2001-	Centre for Chaos and Complex Networks City University of Hong Kong Centre Director: Prof. Guanrong (Ron) Chen	Associate member
1997-2000, 2003-2004	NDES Scientific Committee	Member
1994-1998	MATE, Electronic Measurement Society	Secretary

6 Member of Editorial Board

Date	Journal	Duty
2016-	IEEE Trans. Circ. and Syst. – II	Associate Editor
2012-	Digital Signal Processing, Elsevier	Member of Editorial Board
2003-	Dynamics of Continuous, Discrete and Impulsive Systems, Series B (DCDIS-B)	Associate Editor

7 Organization of international conferences and special sessions

Date	Conference	Duty	Co-organizer
2008	NOLTA	General Co-Chair	T. Endo
2001	IEEE-ISCAS	Organization of a special session on "Application of Chaos to Communication Systems"	G. M. Maggio
2000	IEEE-ISCAS	Organization of a presymposium tutorial on "Chaotic Communications"	M. P. Kennedy
1998	NOLTA	Organization of a special session on "Communicating with Chaos"	M. P. Kennedy
1998	NDES	Conference Chairman	
1998	IEEE-ISCAS	Organization of a special session on "Communicating with Chaos"	M. P. Kennedy
1997	ECCTD	Organization of a special session on "Spread Spectrum Communications and Chaos"	M. P. Kennedy

8 Publications

Number of publications:	173 in English	The most significant ones: 10 book chapters 25 referred international journal papers 17 invited tutorials and keynote addresses 13 IEEE CAS DLP lectures
	3 in Russian	
	25 in Hungarian	
Number of patents:	6 granted (5 Hungarian and 1 Irish)	
Edited publications:	3 special issues and 1 conference proceedings	

Total number of citations: **2,893** (<http://scholar.google.com>), Feb. 27, 2016
h-index = 23 and i-index = 43
Most cited journal paper = 446

Two of his papers, co-authored with Profs. M.P. Kennedy and L.O. Chua, have been ranked in **top-cited IEEE Trans. CAS-I articles**.

9 Longer time periods spent abroad — Part I

Date	Location	Purpose
2015	Beijing Jiaotong University Beijing, China	High-End Foreign Expert Invited by Chinese State Administration of Foreign Expert Affairs
2014	The Hong Kong Polytechnic University Dept. of Electronic and Information Eng. Hong Kong SAR, China	Visiting Overseas Professor
2014	Beijing Jiaotong University Beijing, China	High-End Foreign Expert Invited by Chinese State Administration of Foreign Expert Affairs
2013	The Hong Kong Polytechnic University Dept. of Electronic and Information Eng. Hong Kong SAR, China	Visiting Overseas Professor
2012	The Hong Kong Polytechnic University Dept. of Electronic and Information Eng. Hong Kong SAR, China	Visiting Overseas Professor
2009	The Hong Kong Polytechnic University Dept. of Electronic and Information Eng. Hong Kong SAR, China	Visiting Overseas Professor
2008	University of Toulouse – INSA Laboratoire Toulousain de Technologie et d’Ingénierie des Systèmes Toulouse, France	Visiting Researcher
2007	The Hong Kong Polytechnic University Dept. of Electronic and Information Eng. Hong Kong SAR, China	Visiting Overseas Professor
2004-2005	The Hong Kong Polytechnic University Dept. of Electronic and Information Eng. Hong Kong SAR, China	Visiting Overseas Professor
2002	The Hong Kong Polytechnic University Dept. of Electronic and Information Eng. Hong Kong SAR, China	Academic Visitor
2001	City University of Hong Kong Dept. of Electrical Engineering Hong Kong SAR, China	Academic Visitor
2001	University College Cork Dept. of Microelectronic Engineering Cork, Ireland	Visiting Professor
1999	University College Dublin Dept. of Electronic and Electrical Eng. Dublin, Ireland	Joint research in the framework of INSPECT Project financed by EU

10 Longer time periods spent abroad — Part II

Date	Location	Purpose
1998-1999	University College Dublin Dept. of Electronic and Electrical Eng. Dublin, Ireland	Joint research in the framework of INSPECT Project financed by EU
1997	University College Dublin Dept. of Electronic and Electrical Eng. Dublin, Ireland	Joint research in the framework of INSPECT Project financed by EU
1996	Technical University of Dresden Inst. for Fundamentals of Electrical Eng.	DAAD Scholarship
1996	University of California at Berkeley Dept. of Electrical Eng. and Comp. Sci- ences, Nonlinear Electronics Laboratory Berkeley, USA	Visiting Researcher
1996	Swiss Federal Institute of Technology Lau- sanne Department D'Electricite Lausanne, Switzerland	Visiting Researcher
1996	Technical University of Dresden Inst. for Fundamentals of Electrical Eng. and Electronics Dresden, Germany	Visiting Professor
1995	University College Dublin Dept. of Electronic and Electrical Eng. Dublin, Ireland	Joint research
1995	The University of Hull Dept. of Electronic Engineering Hull, UK	Joint course development in the framework of the TEMPUS Program financed by EU
1994	Swiss Federal Institute of Technology Lau- sanne Department D'Electricite Lausanne, Switzerland	Joint research
1992-1993	Eastern Mediterranean University Dept. of Electrical and Electronic Eng. Famagusta, Cyprus	Associate Professor
1991-1992	Bilkent University Dept. of Electrical and Electronics Eng. Ankara, Turkey	Visiting Assistant Professor
1980	Kiev, USSR	Installation of a microwave radio relay equipment manufactured for the Moscow Olympic Games

11 Major projects involved

- **Laboratory of Software Defined Electronics and Virtual Instrumentation**

In 2012, I established the Laboratory of Software Defined Electronics and Virtual Instrumentation (SDE-VI Lab) at the Faculty of Information Technology and Bionics of Pázmány Péter Catholic University. The SDE-VI Lab has USRP and PXI-based testbeds, FlexRIO FPGA PXIe setup completed with a baseband transceiver adapter and many remote controlled instruments from microwave spectrum analyzer to arbitrary waveform generator. In the SDE-VI Lab any kind of telecommunications systems and test beds can be implemented up to 6.6 GHz using the SDE approach, and various automated calibration and test beds providing traceability can be built.

- **International scientific projects**

- Innovative signal processing exploiting chaotic dynamics (INSPECT), Esprit Project 31103, Open LTR, financed by European Union
- Spread spectrum communication exploiting chaos, financed by the Office of Naval Research, USA

- **System engineering projects**

(at the Research Institute for Telecommunications)

- Low-capacity, easy-to-install digital microwave telecommunication system (FSK, 15 GHz)
- Microwave frequency hopping telecommunication system (1.5 GHz)
- Single channel per carrier satellite telecommunication system
 - * microwave up (6 GHz) and down (4 GHz) converter
 - * single channel per carrier channel unit (QPSK, 70 MHz)

- **Circuit development projects**

(at the Fine Mechanical Enterprise and Research Institute for Telecommunications)

- High speed frequency synthesizer for frequency hopping system (UHF Band)
- Frequency synthesizers and local generators for satellite telecommunication (90-140 MHz) and mobile radio communication systems (130-170 MHz)
- Local oscillators for microwave analog radio relay systems (4 and 6 GHz)
- Microwave transistor power amplifiers and VCO circuits (2 GHz)
- Phase-locked loops for different applications

12 Scientific projects co-ordinated and headed

Date	Title	Financed by
2011-2014	New reconfigurable physical layers and their protocols for resource limited, low-rate WLAN and wearable BAN applications	Hungarian Scientific Research Fund (OTKA), K84045
2010-2013	Ultra-wideband data transmission technologies and the physical layers of their wireless networking devices for ad hoc networks in vehicle communications	Hungarian-French Intergovernmental S&T Cooperation Programme, TÉT_10-1-2011-0736
2009-2013	Research of low-rate wireless ultra wideband (UWB) communication technologies used in sensor networks and embedded systems	Hungarian-French Intergovernmental S&T Cooperation Programme, TÉT_08-FR-2009-0020
2002-2006	Development and analysis of novel signal processing architectures to be applied in integrated circuits	Hungarian Scientific Research Fund (OTKA), K38083
1999-2001	Chaotic signal synthesizers for telecommunications and measurement applications	Hungarian-French Intergovernmental S&T Cooperation Programme, NP-1856, F-29/98
1996-1999	Study of chaotic behavior of nonlinear circuits	Hungarian Scientific Research Fund (OTKA), T20522
1995-1999	Application of chaotic PLL in data transmission	Hungarian Telecommunications Company (MATÁV), 2/95
1994-1995	Theory and applications of nonlinear dynamics and chaos	Hungarian Ministry of Education

13 Subjects taught at different universities

13.1 Subjects taught in English

University and Department	Subjects
The Hong Kong Polytechnic University, EIE Department	<ul style="list-style-type: none">• Advanced Telecommunication Systems• Communication Fundamentals
Pázmány Péter Catholic University, Faculty of Information Technology and Bionics	<ul style="list-style-type: none">• Advanced Telecommunication Systems
Budapest Univ. of Technology and Economics, Dept. of Measurement and Information Systems	<ul style="list-style-type: none">• Theory and Applications of Nonlinear Dynamics and Chaos (PhD course)
University of Pannonia, Dept. of Information Technology and Automation	<ul style="list-style-type: none">• Theory of Signals and Measurements, Digital Signal Processing
Eastern Mediterranean University, EEE Department	<ul style="list-style-type: none">• Analog Electronics• Modern Electronic Communications• Phase-Locked Loops (PhD course)
Bilkent University, EEE Department	<ul style="list-style-type: none">• Analog Electronics• Digital Electronics• Microwave Circuits• Sampling Phase-Locked Loop (PhD course)

13.2 Subjects taught in Hungarian

University and Department	Subjects
Pázmány Péter Catholic University, Faculty of Information Technology and Bionics	<ul style="list-style-type: none">• Circuit Theory and Design• Media Communication via Internet• Software Defined Electronic and Information Systems
Budapest Univ. of Technology and Economics, Dept. of Measurement and Information Systems	<ul style="list-style-type: none">• Sensor Networks• Theory and Design of Embedded Systems• Networking Devices of Embedded Systems• System Level Design of Wireless Networking Devices• Analog and Digital Electronics
Technical University of Budapest, Dept. of Measurement and Instrument Eng.	<ul style="list-style-type: none">• Electrical Instruments and Their Circuits
Technical University of Budapest, Dept. of Microwave Telecommunications	<ul style="list-style-type: none">• Microwave Circuits

14 Industrial research, consultancy service and industrial experience

14.1 Industrial research

Date	Company	Topic
2011-2012	National Instruments, Texas, USA	Implementation of Software Defined Radio (SDR) on NI USRP platform
2011-2012	National Instruments, Hungary	Bit-true, cycle accurate simulation of FPGA-based Digital Down Converter (DDC) on NI LabVIEW platform
2008-2009	National Instruments, Hungary	Implementation of automated test systems on NI LabVIEW platform with traceability
2007-2008	National Instruments, Hungary	Physical layer of new networking data communications devices
2006-2007	Continental Automotive Systems Budapest	Automated production lines

14.2 Consultancy service

Date	Company	Topic
2008-	Mobitel Bt, Budaörs, Hungary	Automated calibration and testing of frequency selective and multichannel GSM repeaters
2010-2011	Bonn Hungary Electronics Ltd, Hungary	Automated calibration and testing of STC radar amplifiers and frequency synthesizers
2004-2005	Samsung Advanced Institute of Technology (SAIT) Suwon, Korea	Chaos-based ultra-wide-band radio
1998-1999	SSL, Dublin, Ireland	Low-IF Bluetooth wireless data communication system

14.3 Research Institute for Telecommunications (TKI), Budapest, Hungary 1980–1991

From 1980 to 1983, I spent three years on leave with the Research Institute for Telecommunications (TKI), supported by a scholarship of the Hungarian Academy of Sciences. In 1981, I joined a department which was set up to develop an SCPC satellite telecommunication system. I took part in the determination of the system specification and in the elaboration of the technical

proposal. Subsequently, I developed the time/frequency unit providing the clock, reference and local signals for the equipment. I was the head of a group of engineers that was established to develop frequency synthesizers.

From 1983 to 1991, I was employed by the Research Institute for Telecommunication, working mainly in the fields of phase-locked loops and frequency synthesis. In 1986, I developed a frequency synthesizer system for a microwave BURST-FH system. In 1988, I determined the system specification and elaborated the technical proposal for an up/down converter equipment developed for the INTERSPUTNIK satellite telecommunication system. In 1989, I developed the system proposal for a low-capacity microwave digital radio relay system.

14.4 Fine Mechanical Enterprise (FMV), Budapest, Hungary 1976–1980

At the Fine Mechanical Enterprise (FMV), I developed high frequency oscillators and microwave local generators for high-capacity microwave radio relay systems. In addition to the development of these circuits, I took part in their transition from the development phase to their mass production. When it was needed I provided a support in the mass production. I also designed and built microwave transistor power amplifiers and VCO circuits. In 1980, I participated in the installation of a high-capacity microwave radio relay system manufactured by the Fine Mechanical Enterprise for the Moscow Olympic Games.