VALERIU BEIU — PROFESSOR

CONTACT INFORMATION

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SPECIALIZATION COMPUTER & ELECTRICAL ENGINEERING

- ***Bio-/brain-inspired nano-architectures (i.e., highly reliable & ultra low-power)***
  - Advanced VLSI (low power, reliability enhanced gates/circuits, novel communication schemes)
  - Digital design (including threshold logic)
  - Circuit & VLSI complexity
  - Hardware implementations of neural networks (including constructive neural learning)
  - Biological/neural computations and communication (including massively parallel architectures)
  - Computer architectures and computer arithmetic

BIO-SKETCH

I graduated in 1980 from the Computer Science & Engineering Department of the University "Politehnica" of Bucharest (Romania) with a MSc thesis on high-speed graphic workstations (*Best MSc Thesis Award*). I researched, designed and developed ultra high-speed floating-point units (FPUs) and central processing units (CPUs) for two years while with the Research Institute for Computer Techniques, Bucharest (Romania). Returning to the University "Politehnica" of Bucharest, I became Assistant Professor (1983), and Senior Lecturer (1990), teaching, researching (computer architecture, VLSI design, digital circuits, artificial neural networks), and supervising (29 MSc theses).

In 1991, being awarded both a *Fulbright Research Fellowship* (USA) and a *PhD Scholarship* (Belgium), I went for the doctoral studies, and have been on leave of absence from the University "Politehnica" of Bucharest (till 2001).

11/1991 – 11/1994 • PhD candidate with the Electrical Engineering Department, Katholieke Universiteit Leuven (Belgium), where in May 1994 I earned my *PhD summa cum laude* (*highest honors*) for a thesis on area- and time-efficient VLSI implementations of artificial neural networks using threshold logic gates.

12/1994 – 09/1996 • *Human Capital and Mobility Individual Research Fellow* of the European Union with the Centre for Neural Networks, King's College London (UK), conducting research on programmable neural arrays.

10/1996 – 08/1998 • *Director's Postdoctoral Fellow* with the Space and Atmospheric Sciences Division, Los Alamos National Laboratory (USA), investigating adaptive/reconfigurable field programmable neural arrays for deployable adaptive processing systems.

09/1998 – 05/2001 • *CTO and co-founder* of RN2R LLC and *Fellow* of Rose Research (Dallas, USA), coordinating research on ultra-fast low-power VLSI enabling neural-inspired gates and circuits.

From June 2001 I became an Associate Professor with the School of Electrical Engineering & Computer Science, Washington State University, involved in teaching (VLSI/nanoelectronics, ASICs/FPGAs, neural computations, computer architecture), researching (low-power and highly reliable VLSI circuits, emerging biological-inspired nano-architectures), and supervising (1 PhD and 2 MSc). In March 2005 I was offered a visiting professor position with the School of Intelligent Systems, University of Ulster (Londonderry, UK), and in July 2005 I joined the College of Information Technology (CIT), United Arab Emirates University (UAEU, Al Ain, UAE) as *Chair of Computer Engineering* (2005–2006), where in 2006 I was promoted to *Associate Dean for Research & Graduate Studies* (2006–2011) while also supervising (1 Postdoc and 2 MSc). In Fall 2015 I joined "Aurel Vlaicu" University of Arad (UAV, Arad, Romania), and started to teach in two graduate programs as well as leading a 2M€ research grant (2016–2021) and supervising (2 Postdocs and 11 MSc).

I am/was PI or co-PI on 44 grants/contracts ***totaling over 51 M$*** (as well as PI on 101 short-term travel grants). The research results have been published/accepted: 2 books (3 more in painfully slow progress), 8 book chapters (7 invited), 20 patents, 44 journal papers, and 226 conference papers (28 invited and 8 best paper awards); presented over 500 times (out of which 235 invited keynote/tutorials/presentations); and cited 2112 times (excluding self-citations).

I have been a reviewer for the National Science Foundation (USA), the European Commission (EU), as well as for the science foundations of Romania, Belgium, Cyprus, Switzerland, UAE, and for many journals and conferences. I was an *Associate Editor* of *IEEE Transactions on Neural Networks* (2005–2008), *IEEE Transactions on VLSI Systems* (2011–2015), *Nano Communication Networks* (2010–2015), *Mathematics* (since 2021), *Frontiers in Neuro Science* (since 2022), and *Romanian Journal of Mathematics & Computer Science* (since 2025). I have contributed to organizing 138 international conferences and 14 invited workshops, chaired 68 conference sessions, and I am a Senior Member of the IEEE since 1996 (in 1997 I was the Program Chairman of the IEEE Los Alamos Section), a founding member of the European Neural Network Society (ENNS), and a member of the: the Association for Computing Machinery (ACM), the International Neural Network Society (INNS), and the EU Marie Curie Fellowship Association (MCFA). Additionally, I was a member of the SRC-NNI Working Group on Novel Nano-architectures (since 2003), the IEEE CS Task Force on Nano-architectures (since 2005), and the IEEE Emerging Technologies Group on Nanoscale Communications (since 2010).

ACCOMPLISHMENTS

"We know what we are, but know not what we may be." — *William Shakespeare*

TOP 2%	• Stanford & Scopus	**Top 2% scientists**	10.1371/journal.pbio.3000918		2020 – …
DIRECTOR	• UAV	NANOART, THUNDER^2	Arad	Romania	2016 – 2024
ASSOCIATE DEAN	• UAEU	CIT	Al Ain	UAE	2006 – 2011
CHAIR CE	• UAEU	CIT	Al Ain	UAE	2005 – 2006
FELLOWSHIPS	• Rose Research	Fellow	Dallas, TX	USA	1999 – 2001
	• Director's PostDoc	Fellow	Los Alamos, NM	USA	1996 – 1998
	• Individual Research	HCM Fellow (EU)	London	UK	1994 – 1996
	• Doctoral Research	Fellow	Leuven	Belgium	1991 – 1994
	• Fulbright Research	Fellow	–	USA	1991
PHD	• Improved on the size/depth complexity for certain classes of Boolean functions				
SUMA CUM LAUDE	• Found novel VLSI-friendly constructive (learning) algorithms (analogous to EDA-like synthesis)				
PUBLICATIONS	• Books		2		(3 in progress)
	• Chapters		8	7 invited	(5 in progress)
	• Patents		20		
	• Journal papers (peer-reviewed)		44	3 invited	(7 in progress)
	• Conference papers (peer-reviewed)		226	28 invited & 8 Best Paper Awards	
	• Citations (excluding self-citations)		2112		
CONTRACTS	• Research grants/contracts		44		
OVER 51 M$	• Short-term travel grants		101		
TEACHING	• Advanced VLSI/Nanoelectronics, ASIC, Neural Computations, Neural Nets, Computer Architecture				
	• PostDoc (3), PhD (1), MSc (44)		48	13 UAV, 3 UAEU, 3 WSU, 29 UPB	

RESEARCH RELATED ACTIVITIES

- Referee for: National Science Foundation USA (28×), European Commission EU (6×), Belgium (2×), Cyprus (2×), Switzerland (2×), UAE (12×), and Romania (30×)
- Reviewer for: IEEE T. Nanotech., IEEE T. Neural Nets, IEEE T. Comp., IEEE T. Sys. Man & Cyber., IEEE T. CAD, IEEE T. Design & Test, IEEE T. VLSI, IEEE Access, ACM J. Emerg. Tech., Nanotech., Neural Nets., Neural Net. World, Neural Proc. Lett., Electr. Lett., etc.
- Associate Editor (2005 – 2008) IEEE Transactions on Neural Networks
- Associate Editor (2010 – 2016) Nano Communication Networks (Elsevier)
- Associate Editor (2011 – 2015) IEEE Transactions on VLSI Systems
- Associate Editor (2020 – …) Applied Sciences (Springer)
- Associate Editor (2021 – …) Mathematics (MDPI)

• Associate Editor (2022 – …)	Frontiers in Neuro Science (Frontiers)		
• Associate Editor (2025 – …)	Romanian Journal of Mathematics & Computer Science		
• Best Paper Awards	8		
• Invited sessions/workshops	14		
• Invited articles in journals	3		
• Invited keynote/plenary	31		
• Invited tutorials	19		
• Invited lectures/seminars	66		
• Invited presentations (others)	119	(out of which 46 to industry)	
• Organized international conferences	138		
• Chaired sessions at international conferences	68		

MEMBERSHIP

- Institute of Electrical and Electronic Engineers IEEE (*Senior Member* since 1996), International Neural Network Society (INNS), European Neural Network Society (ENNS, founding member), Association for Computing Machinery (ACM), EU Marie Curie Fellowship Association (MCFA)

MISCELLANEOUS

- *Four Gold Medals* (First Prize) at the National Physics Olympics
- *Best MSc Thesis Award*
- Expert of the European Artificial Neural Network Activity (DEANNA)
- Expert of the Romanian Academy of Sciences

CURRENT RESEARCH

- My current research activities are focused on nano-architectures, my major aim being to strengthen cooperation on *bio-/brain-inspired nano-architectures*, promote education, and generate new funding opportunities. My hope is that, through direct collaboration (special sessions, visits, grants, etc.), the number of experts joining such efforts will grow. The ultimate goal is ***to advance understanding of enabling architectures*** which would match novel (beyond CMOS) devices and their associated communication schemes, performing research starting ***from ultra-low power reliability-enhanced bio-/brain-inspired circuitry up to larger scale systems***.

EDUCATION

"Ability is of little account without opportunity." — *Napoleon Bonaparte*

POSTDOCTORAL

1996 – 1998	• LANL Director's Postdoctoral Fellow		Los Alamos National Lab
1994 – 1996	• EU Human Capital and Mobility (HCM) Individual Research Fellow		King's College London

PHD IN CE/EE — SUMMA CUM LAUDE (HIGHEST HONORS) — KATHOLIEKE UNIVERSITEIT LEUVEN

1994 MAY	• Thesis	*Neural Networks Using Threshold Gates — A Complexity Analysis of Their Area- and Time-Efficient VLSI Implementations*		
1992	– Specialization	Neural Networks	**INST. UNIV. KURT BÖSCH**	Certif.
1991	PhD exam	Parallel & Advanced Architectures	UPB	10/10
1990	PhD exam	Novel VLSI Structures	UPB	10/10
	PhD exam	Systolic & Neural Architectures	UPB	10/10
	PhD exam	Mathematical Complements	UPB	10/10
1989 MAY	– PhD entrance exam	*VLSI Efficient Implementations of Parallel Architectures*	UPB	10/10

MSC IN CS/CE — BEST THESIS AWARD — UNIV. "POLITEHNICA" BUCHAREST

1980 JUNE	• MSc Thesis	*High-Speed Graphic Parallel Accelerators*	GPA 4.00/4.00	10/10
1979 DECEMBER	• BSc in CE		GPA 3.90/4.00	9.76/10

BACCALAUREATE — FIRST PLACE — "TUDOR VIANU" COLLEGE OF IT

The Diploma of Baccalaureate states that I am a *"programmer and software assistant analyst"*

1975 GRE EQUIV.	• Final examination (Baccalaureate)	GPA 3.84/4.00	9.60/10
1975	• *Valedictorian* (i.e., highest GPA at graduation)	GPA 3.70/4.00	9.26/10

ALMA MATERS

University "Politehnica" of Bucharest – Founded in 1818, it is the largest technical university of Romania with almost 40,000 students (upb.ro). The Computer Science & Engineering Department (CSE) was founded in 1969 (cs.pub.ro) by prof. Mircea Petrescu.

Katholieke Universiteit Leuven – Founded in 1425, is the oldest catholic university of Northern Europe, recognized for names like Erasmus, Mercator, and Vesalius (www.kuleuven.be), is *in the world's top 100 universities* (***45*** in THE, ***59*** in QS – 2027 World University Rankings), and is the largest university in Belgium with over 50,000 students. The EE Department of was founded in 1900 (www.esat.kuleuven.be).

King's College London – Founded in 1829, is one of the larger and oldest of London (www.kcl.ac.uk), with about 27,000 students, and is *in the world's top 100 universities* (***40*** in THE, ***37*** in QS – 2027 World University Rankings). The Mathematics Department (www.kcl.ac.uk/mathematics) has received the highest rating in the Research Assessment Exercise, being a 'center of excellence'. The *Centre for Neural Networks* was the coordinator of the *European Neural Networks Network of Excellence*.

ADVISORS

Prof. Mircea Petrescu – Founder of the CSE Department, Vice-Provost, and Director of the Computer Center, State Secretary of the Government of Romania, as well as Visiting Professor at the University of California at Berkeley (USA) and at the University of Grenoble (France). He was Vice-President of the Romanian Academy of Technical Sciences and is an honorary member of the Romania Academy of Sciences. He has published more than 120 articles and 8 books. ro.wikipedia.org/wiki/Mircea_Petrescu

Prof. Joos Vandewalle – Has been Vice-Dean, Visiting Professor at the University of California at Berkeley (USA), Chairman of the EE Department, and holder of the Francqui Chair on Neural Networks at the University of Liege (Belgium). He was elected Fellow IEEE in 1992, and Fellow IEE in 1998, and was the Vice-President for Region 8 of the IEEE Society on Circuits & Systems, and the coordinator of the Center for Neural Networks (Belgium). He has published over 600 articles and 18 books. www.kuleuven.be/wieiswie/en/person/00009485

Prof. John G. Taylor – Has been Director of the Centre for Neural Networks and President of the International Neural Network Society. He has held positions at: Institute of Advanced Study, Princeton (USA); Institut des Hautes Etudes, Paris (France); Christ College, Cambridge (UK); Mathematics Institute, Oxford (UK); Physics Department, Southampton (UK); Queen Mary College, London (UK); Rutgers University, New Jersey (USA). He has published more than 400 articles and over 20 books. en.wikipedia.org/wiki/John_G._Taylor

POSITIONS HELD	DATES	INSTITUTION	ADDRESS
PROFESSOR	• ***09/2015 –***	***"Aurel Vlaicu" University Faculty of Exact Sciences***	***2-4 Elena Dragoi Str. RO-310330 Arad, Romania***
Professor	08/2008 – 08/2015	UAE University	Maqam Campus, Bldg. E1
Associate Dean	08/2006 – 08/2011	College of IT	PO Box 15551, Al Ain, UAE
Chair CE	07/2005 – 08/2006		
Visiting Professor	03/2005 – 08/2011	University of Ulster	Londonderry, UK
	07/2003 & 08/2004	Heinz Nixdorf Institute	Paderborn, Germany
	07/2002 & 04/2008	Los Alamos National Lab. Theoretical Division	MS 319, Los Alamos NM 87545, USA
Associate Professor	06/2001 – 06/2005	Washington State Univ. School of EECS	Spokane 102, Pullman WA 99164, USA

Co-founder • 05/1998 –	RN2R LLC	Merit Drv.12750, #1020
CTO/Fellow 09/1998 – 05/2001	Rose Research	Dallas, TX 75251, USA
Director's 10/1996 – 08/1998	Los Alamos National Lab.	MS D466, Los Alamos
PostDoc Fellow	Division NIS	NM 87545, USA
EU HCM 12/1994 – 09/1996	King's College London	Strand, London
Res. Fellow	Centre for Neural Networks	WC2R 2LS, UK
Res. Fellow 05/1994 – 11/1994	Katholieke Univ. Leuven	Kasteelpark Arenberg 10
PhD cand. 11/1991 – 05/1994	EE Dept., ESAT-ACCA	Leuven, B-3001 Belgium
Co-founder • 04/1990 –	SPRING Software Consult SRL	Blvd. Magheru 20, Bucharest
President 04/1990 – 08/1991		RO-10721, Romania
Senior Lect. 01/1990 – 06/2001	Univ. "Politehnica" of	Spl. Independentei 313, Bucharest
Assist. Prof. 01/1983 – 12/1989	Bucharest, CSE Dept.	RO-10334, Romania
Senior Res. 09/1981 – 01/1983	Research Institute for	Cl. Floreasca 167/9, Bucharest
Res. Eng. 09/1980 – 08/1981	Computer Techniques	RO-14459, Romania

TEACHING

"I like to learn, but I don't like to be taught" — *Winston Churchill*

I have been teaching/lecturing since 1981. Between 1981 and 1983 I have been teaching part time, while since 1983 I have been teaching full time in the Computer Science & Engineering (CSE) Department of the University "Politehnica" of Bucharest (UPB): Assistant Professor (1983–1990), and Senior Lecturer (1990–2001). Between 1984 and 1991 I supervised 29 MSc candidates. Between 2001 and 2005, I was with the School of Electrical Engineering & Computer Science (EECS), Washington State University (WSU), where I supervised 2 MSc and 1 PhD, and contributed to getting the ABET accreditation of the newly formed Computer Engineering program. In 2005 I joined the College of Information Technology (CIT), United Arab Emirates University (UAEU), being also visiting professor with the University of Ulster (UU). At UAEU I contributed to the ABET accreditation of the CIT, which started offering MSc in Fall 2013. That is why, since joining UAEU (in 2005), my graduate supervision has been limited: invitations on 8 PhD evaluation committees, supervising 2 MSc, and advising 1 PostDoc. Since Fall 2015 I am involved with two graduate programs offered by the "Aurel Vlaicu" University of Arad (UAV) having advised 11 MSc and supervised 2 PostDocs. Additionally, I have given 19 invited tutorials and 66 invited lectures.

	COURSES TAUGHT/DEVELOPED	SINCE	UPB	WSU	UAEU	UAV
UNDERGRADUATE	– Hardware Testing & Fault Tolerance	2013			UAEU	
	– Professional Responsibility in IT	2012			UAEU	
	– Advanced Computer Architecture	2006			UAEU	
	– ASIC & Digital Systems/VLSI Design	2001		WSU	UAEU	
	– Introduction to Algorithms/Programming	1984	UPB			UAV
	– Digital Computer Architecture	1983	UPB		UAEU	UAV
	– Analysis & Synthesis of Digital Circuits	1981	UPB		UAEU	
GRADUATE	– Neuro-Bio Fundamentals	2015				UAV
	– Research Methods in IT	2011			UAEU	UAV
	– Advanced VLSI/Nanoelectronics	2004		WSU		
	– Neural Computations	2003		WSU		UAV
	– Neural Networks & Applications	1990	UPB	WSU		UAV
	– VLSI/Intelligent Circuit Design	1983	UPB	WSU		UAV
	– Advanced Computer Architecture	1983	UPB			
	– Testing & Performance Evaluation	1982	UPB			

STUDENTS EVALS. • Constantly higher (avg. ***4.65/5.00***) than college (CIT 4.48/5.00) and university (UAEU 4.41/5.00)

GRADUATE SUPERVISING — UAV (13), UAEU (3), WSU (3), UPB (29)

2026	48	– Artificial Neural Networks for Number Sequences	Ruben-Samuel Farcut	MSc
2025	47	– From Kolmogorov Superposition to Networks Using MATLAB	Naomi-Margareta Suci	MSc
	46	– Kolmogorov-Arnold Networks and the Classical Two-Spiral	Mihaela Hontan	MSc
2024	45	– Designing Neural Networks Using Memristors	Valentin Puiu	MSc
2022	44	– Optimal Models for Emotion Recognition	Vladlena Parolea	MSc
2020	43	– Early Stage Investigations Using IBM Quantum Experience	Daniel-Tiberiu Patcaş	MSc
	42	– The Importance of Recommender Systems	Roland-Norbert Kirch	MSc
	41	– Testing the Reliability of Repetitive Quantum Circuits	Florin-Daniel Morar	MSc
2018	40	– Using Deep Learning for Data Analysis	Ionel Mazilu	MSc
	39	– On the Reliability of Critical Networks	Dan-Cristian Pascu	MSc
	38	– 3D Fibonacci Spirals	Beniamin-Otniel Voian	MSc
	37	– ***Optimizing Two-terminal Networks Using Compositions***	Vlad Dragoi	***PostDoc***
2017	36	– ***Hammock Networks and Generalizations***	Simon R. Cowell	***PostDoc***
2013	35	– Monte Carlo Analyses of XOR-2 in 22/16nm PTM (BITS Pilani)	Nilay V. Acharya	MSc
	34	– Monte Carlo Analyses of MAJ-3 in 22/16nm PTM (BITS Pilani)	Jithu Lissi Raju	MSc
2012	33	– ***Brain-inspired Interconnects for Nanoelectronics***	Pietro Santagati	***PostDoc***
2004	32	– ***Design & Analysis of SET: Neural-Inspired Gates & Circuits***	Mawahib H. Sulieman	***PhD***
	31	– Optimizing the Performance of Direct Digital Frequency Synthesizers for Low-Power Wireless Communication	David Betowski	MSc
2003	30	– Precise Sine Approximations with Reduced Resources	Pao-Szu Wu	MSc
1991	29	– Simulator for the Implied Minterm Structure	Simona Ivanov	MSc
1990	28	– Set of C Functions for Simulating Parallel Processes	Dinu Creteanu	MSc
	27	– Graphic Interface for a Neural Network Simulator	Dan Stoicescu	MSc
	26	– Microbusiness Software Package	Anca Costin	MSc
	25	– Neural Network Arithmetic Logic Unit	Yousuf Basmark	MSc
	24	– VLSI Parallel Architecture for Histogram Modification	Aida Gheorghiu	MSc
	23	– Boltzmann Machine Simulator	Mihaela Dumbrava	MSc
	22	– Neural Network Solutions to Optimization Problems	Orest Robciuc	MSc
	21	– Motion Detection Using Neural Networks	Anca Sigala	MSc
	20	– Enhanced VLSI CAD Package	Daniel Mandu	MSc
1989	19	– Recognition of Characters Using Neural Networks	Abdel Nehad	MSc
	18	– Neural Network Medical Expert System	Sima Gheorghita	MSc
	17	– VLSI Animated Lesson for PC	Şerban Benone	MSc
1988	16	– Neural Network Simulator	Sobhui Darwish	MSc
1987	15	– VLSI CAD Tool: Place & Route	Anca Şerban	MSc
	14	– VLSI CAD Tool: Interactive Layout	Mariana Mirea	MSc
1986	13	– Computer Interface for a Rotating Magnetic Head Unit	Sorinel Ciobanu	MSc
	12	– CAD Tool for Digital Image Segmentation	Cornelia Ciotînga	MSc
	11	– CAD Tool for Digital Image Enhancement	Mihai Dinu	MSc
1985	10	– Systolic Floating Point Coprocessor: Multiplication & Division	Eugen Paşol	MSc
	9	– Systolic Floating Point Coprocessor: Addition & Subtraction	Liviu Zuzu	MSc
	8	– VLSI Ultra High-Speed Arithmetic Units	Marius Ionescu	MSc
	7	– Dedicated Serial Data Multiplier	Daniel Manica	MSc
	6	– Systolic Circuits for Convolution	Anca Tanga	MSc
	5	– A Study of Permutation Networks for VLSI Implementation	Sorin Tene	MSc
1984	4	– VLSI Rule Checking Expert System	Manuela Anton	MSc
	3	– High Speed Arithmetic Units	Bianca Tudor	MSc
	2	– Self-Testable RAM/CAM Memory	Cristina Borş	MSc
	1	– Self-Testable & Self-Repairable Correlation Circuit	Irina Manole	MSc

POTENTIAL FOR COURSE DEVELOPMENT

ADVANCED VLSI/ NANOELECTRONICS

- Novel nano-devices, new design styles, reliability enhancements, and reconfigurable computing

Examples https://online.stanford.edu/courses/ee316-advanced-vlsi-devices
https://www.ee.columbia.edu/~kinget/EE9303_S21/
https://ece-research.unm.edu/jimp/vlsiII/index.html

ELECTRONIC NANOTECHNOLOGY

- This course could precede **ADVANCED VLSI/NANOELECTRONICS**

Examples https://nanohub.org/resources/courses
https://www.cs.cmu.edu/afs/cs/academic/class/15849c-s02/www/schedule.htm
https://www.cise.ufl.edu/research/revcomp/physlim/

QUANTUM COMPUTING

- Could be based on the 14 seminars I organized/gave at UAV (during 2019-2020)

Examples https://learn-xpro.mit.edu/quantum-computing
https://ocw.mit.edu/courses/mathematics/18-435j-quantum-computation-fall-2003/
https://www.youtube.com/@dela3499/courses (David Deutsch's lectures)

DIGITAL COMPUTER ARITHMETIC

- Classic course bridging algorithms and hardware; I plan to use the books of Ercegovac & Lang https://web.cs.ucla.edu/digital_arithmetic/ and Koren http://www.ecs.umass.edu/ece/koren/arith/

Examples https://web.cs.ucla.edu/~milos/CSM51A-F19-Syllabus.pdf
https://web.cs.ucla.edu/~milos/CS252A-W20-Syllabus.pdf
https://www.epfl.ch/labs/lap/courses/ ["Computer Arithmetic" not active anymore]
https://scholar.google.com/citations?user=1A4y8RcAAAAJ

BIO-/BRAIN-INSPIRED COMPUTATIONS & COMMUNICATIONS

- This course will go on to cover the digital-to-analog divide as well as parallel-and-neural computing architectures, learning and the power-reliability-communication design tradeoffs

Examples https://pages.jh.edu/aandreo1/761/ & https://pages.jh.edu/aandreo1/762/
https://seunglab.org/

RESEARCH

"Never lose a holy curiosity." — *Albert Einstein*

EXPERIENCE

- ***I was involved in research for over 47 years, holding management positions for over 25 years, and executive positions for more than 15 years.***

EXPERTISE

- My expertise encompasses a range of areas starting from circuit/VLSI complexity, going through information theory, optimization techniques, and neural computations, to advanced VLSI/ nanoelectronics and adaptive/reconfigurable circuits and systems.

INTERESTS

- I like to take abstract concepts for difficult but practical applications, turn them into efficient algorithms, and then design innovative VLSI circuits performing them optimally (e.g., at ultra-high speeds, with very low power/energy, highly reliable, etc.). I am extremely interested by emerging nanoelectronics and in particular by bio-/brain-inspired nano-architectures (massively parallel, adaptive/reconfigurable, fault-tolerant, using alternate communication schemes), and by their optimized designs inspired by arrays (e.g., biological/ion-channels, cellular, systolic).

SIGNIFICANT RESEARCH RESULTS (FIRST EVER)

- ***Advancing the understanding of reliable computations and communications*** 2017 –
- ***Generalizations of hammock nets to 3D (akin to axonal transport networks)*** 2017 –
- ***Energetics of neural communication ($10^{3...4}\times$ lower energy than CMOS)*** 2015 –
- ***Reliability of hammock nets (over $10^{10}\times$ better than von Neumann multiplexing)*** 2015 –
- Reported the best lower and upper bounds for consecutive-*k*-out-of-*n* systems 2014
- Designed ultra low-power hybrid NEMS-CMOS circuits 2014
- Analyzed Schmitt trigger gates/circuits (performances vs. applications) 2013
- Detailed & accurate Monte Carlo simulations using Predictive Technology Models 2013
- Highly reliable and low power CMOS circuits based on novel enabling sizing of transistors 2012

- Low-power and highly reliable bio-inspired arrays for communication and computation 2010
- Axon-inspired redundancy scheme ($10^3\times$ better than von Neumann multiplexing) 2009
- Bayesian EDA tool for very accurate reliability estimates (devices, input vectors, wires) 2009
- Introduced & evaluated NOR-2 von Neumann multiplexing 2010
- Estimated wires' reliability due to intrinsic noises (shot, thermal) 2009
- Used Rent rule to explain Brain's columnar structures (optimal hierarchical networks) 2007
- Devices & input vectors are more important than gates (when evaluating reliability) 2007
- Showed that serial connected architectures are optimal for nanoelectronics 2005
- Designed and simulated single electron transistor gates & circuits considering variations 2005
- Designed & simulated the largest single electron transistor circuit 2004
- Exact calculations of the reliability of von Neumann multiplexing (gate-level) 2004
- Proposed novel highly reliable and low-power locally connected architectures 2004
- Highly accurate piecewise linear, non-linear, and hybrid ROM-less DDFS 2003
- Noise-robust low power (self-timed, charge recycling, sub-threshold) perceptrons 2000
- Designed ultra-high performance adders using Fibonacci-weighted threshold gates 1999
- Showed that deeper & sparser artificial neural nets are VLSI-optimal 1997
- The best/tightest circuit complexity bounds for feed-forward neural computations 1994
- Proposed a continuous version of the Boltzmann machine 1992
- Self-testable and self-repairable units are a must for VLSI 1984

HISTORY

1979 – 1989
- My research has been centered on *digital VLSI*, and in particular on: high-speed processing units (ALUs), smart memories (e.g., content addressable, set processing, hierarchical, self-testable), regular arrays (e.g., systolic, cellular). On these topics I have published about 20 papers. Since 1985 I have started looking into neural networks. This shift of interest was clearly marked by the paper "From Systolic Arrays to Neural Networks," *Scientific Annals of Al. I. Cuza Univ.*, 35(4):375–385, 1989 (J_3).

1985 – 1992
- I have been 'learning' about *neural networks*, publishing about their capabilities (for image enhancement and recognition), and delved into Boltzmann machines introducing the new concept of a *continuous Boltzmann machine* (C_{28}). On these topics I have published about 10 papers.

1992 – 2002
- I have been working on *hardware/VLSI implementations of threshold logic gates (perceptrons)*. On these topics I have published about 80 papers. This direction of research can be subdivided into:
  – *constructive learning* algorithms (equivalent to CAD/EDA synthesis, e.g., based on decomposition of functions, using the entropy of the data set, based on Kolmogorov's superpositions, etc.);
  – theoretical *circuit/VLSI complexity* issues;
  – hardware implementations (e.g., mapping onto FPGAs);
  – VLSI implementations (e.g., high-speed, low-power, reliability enhanced, noise immune).

SINCE 2003
- I have been focusing on *nano-architectures*. On this topic I have published over 200 papers:
  – ultra low-power and reliability-enhanced (gates, circuits and systems);
  – from von Neumann multiplexing to novel array-based redundancy schemes (e.g., axon-inspired);
  – brain-inspired hierarchical optimal interconnect topologies/networks;
  – analyses of wires and alternate communication paradigms.

RESULTS
- ***Funded*** ***44 research grants/contracts, and 101 short-term travel grants*** ***51 M$***

Published 2 books, 8 chapters, 20 patents, 44 journals, 226 conferences
Invited 31 keynotes, 19 tutorials, 66 lectures, 119 presentations (out of which 46 to industry)
Cited 2112 times (excluding self-citations) – hand counted (available upon request)
Organized 138 conferences, 68 sessions chaired

RESEARCH PROJECTS/GRANTS (AWARDED, DIRECTED, ETC.)

Have considered	– EDA for NEMS and Reliability-Optimal CMOS-transistor Sizing (EDA-ROCS) With W. Ibrahim (UAEU), and T.-J. King Liu (UC Berkeley)	Co-PI	
	– Ultra Reliable Array-based Architectures for CMOS and Beyond (URA^2) With L. Anghel (INP Grenoble), NanoSciences Foundation	PI	
	– Novel Biologically-inspired Architectures for nano-Devices (NBAD) With G. Fettweis (TU Dresden), EU ERC Advanced	PI	
2025	– Science in Schools (01/05/2025), contract nr. 8SSSC/07.04.2025	PN-IV-P10-SS-SC-2024-0128	
2024	– Mobilities for Young Researchers, contract nr. 4/07.06.2024	PN-IV-P2-2.2-MCT-2024-0054	
2021 – 2024	• Techniques for Unconventional Nano-Designing in the Energy-Reliability Realm	PI	1.2MRON
THUNDER^2	Started on 01/09/2021 (contract PCE nr. 238/07.04.2021) V. Dragoi (UAV), S. Cowell (UAV), R. Beiu (UAV), L. Daus (UTCB), M. Jianu (UTCB), M. Tache (UPB)	PN-III-P4-ID-PCE-2020-2495	
2022	– Short term travel grants (invited): ICCCC'22 (US$ 500)		0.5K$
2020	– Short term travel grants (invited): ICCCC'20 (US$ 500), SOFA'20 (US$ 300)		0.8K$
2019	– Short term travel grants (invited): ECC'19 (US$ 300)		0.3K$
2018	– Short term travel grants (invited): ICCCC'18 (US$ 800), SOFA'18 (US$ 600)		1.4K$
2016 – 2021	• Novel Bio-inspired Cellular Nano-architectures	PI	9.3MRON
BioCell-NanoART	With V.-F. Duma (UAV), F.-D. Munteanu (UAV), C. Stoica (UAV), P. Gaspar (UAV), V.E. Balas (UAV), M. Balas (UAV), A. Cavaco-Paulo (U Minho), L. Daus (UTCB)	POC-A1-A1.1.3-E nr. 30/2016	
2016	– Short term travel grants (invited): ICCCC'16 (US$ 500), SOFA'16 (US$ 500) IEEE-NANO'16 (US$ 1,000)		2K$
2014 – 2016	• ATIC-SRC Center of Excellence in Energy Efficient Electronic Systems (ACE^{4}S)	Co-PI	35MAED
ULP-DigiFinA	Task: Ultra-low Power Digital Sub-threshold FinFET Amplifiers Originally with G. Fettweis (TU Dresden) and M. Alioto (Natl. U Singapore) https://www.src.org/newsroom/press-release/2013/452/	SRC GRC ACE^{4}S	
2013 – 2016	• Strengthening Research Collaborations in High-impact and Emerging Technologies between GCC and EU	Co-PI EU EM 545790-EM-1-2013-1-UK-ERA MUNDUS-EMA22	1.23M€
SECRET	With *B. Aziz M. Rahman* PI (City U London), G. Cuniberti (TU Dresden), V. Hessel (TU Eindhoven), O. Benitez (U Deusto), P. Candeloro (U Magna Graecia), C. Themistos (Frederick U), H. Bourdoucen (Sultan Qaboos U), F. Bou-Rabee (Kuwait U), S.A. Al-Mansoori (U Bahrain), F. Kharbash (UAEU)		
2012 – 2015	• Synaptic Molecular Networks for Bio-inspired Information Processing	Co-PI	2.81M€
SYMONE	With *G. Wendin* PI (Chalmers U), D. Vuillaume (CNRS-IEMN), J. Roncali (CNRS-MOLTECH), M. Calame (Basel U), S. Yitzchaik (HUJI), C. Gamrat (CEA), and G. Cuniberti (TU Dresden)	EU FP7-ICT-318597	
2012 – 2014	• Unconventional Sizing for Enabling Low Power Digital Design	PI	200K$
Use-LP	With M. Alioto (U Siena/Natl. U Singapore), A. Beg (UAEU), W. Ibrahim (UAEU), and F. Kharbash (UAEU)	SRC 2012-TJ-2332	
2011 – 2015	• Ultra Low-Power Application-specific Non-Boolean Architectures [Intel Co]	Co-PI	1M$
ULP-NBA	With *Intel* PI, D. Hammerstrom (Portland State U), W. Porod (U Notre Dame), S.P. Levitan (U Pittsburgh), T. Shibata (U Tokyo), T. Roska (Hungarian Acad. Sci.), M. Pufall (NIST), D. Weistein (MIT), and M.R. Stan (U Virginia)	URO 2011-05-24G	
2011 – 2015	• Ultra Low Power NEMS-CMOS	PI	300K$
ULP-NEMS-CMOS	With T.-J.K. Liu (UC Berkeley), W. Ibrahim (UAEU), and A. Beg (UAEU)	SRC 2011-HJ-2184	
2011 – 2013	• Brain-inspired Interconnects for Nanoelectronics (BiIN)	PI	586KAED
	With W. Ibrahim (UAEU) [UAE Natl. Res. Found.]	NRF 1108-00451	
2011 – 2013	• Algorithms & EDA for Accurate Nano-Circuits Reliability Calculations (CREDA^2)	Co-PI	506KAED
	With *W. Ibrahim* PI (UAEU) [UAE Natl. Res. Found.]	NRF 1108-00329	
2013	– Short term travel grants (invited): TUDresden (US$ 7,000)		7K$

2012	– Short term travel grants (invited): EDCC'12 (US$ 1,000)		1K$
2011	– Short term travel grants (invited): IEEE-NANO'11 (US$ 500), EU Brussels (US$ 8,000), EU Paris (US$ 5,000), NSF (US$ 5,000), ATIC-SRC (US$ 10,000)		28.5K$
2011 – 2012	• Brain-inspired Hybrid Topologies for Nano-architectures [SRC 2011-RJ-2150G]	PI	40K$
2010	– Short term travel grants (invited): IDT'10 (US$ 500), IJCNN'10 (US$ 1,500), INC6 (US$ 1,000), MEES'10 (US$ 3,000)		6K$
2009 – 2011	• Brain-inspired Interconnects for Nanoelectronics [British Council PMI2 RCGS271]	PI	39KUK£
2009 [on hold]	• Emirates Center for Nanoscience & Nanoengineering [UAE Natl. Res. Found.]	Co-PI	50MAED
2009	– Short term travel grants (invited): EU (US$ 7,000), U Oslo (US$ 5,000), IEEE-NANO'09 (US$ 1,000), ESSCIRC'09 (US$ 1,500), NanoNet'09 (US$ 1,000), WDSN'09 (US$ 5,000)		20.5K$
2008	– Short term travel grants (invited): NSF (US$ 5,000), LANL (US$ 2,000), SAMOS VIII (US$ 5,000), Tohoku U (US$ 10,000), U Paris-Sud (US$ 3,000), U Oslo (US$ 5,000)		33K$
2007	– Short term travel grants (invited): NSF (US$ 5,000), EU (US$ 8,000), HP Labs (US$ 6,000), FENA/UCLA (US$ 1,000), ULSIWS'07 (US$ 400), ISMVL'07 (US$ 1,000), SHARCS'07 (US$ 2,000), DTIS'07 (US$ 3,000), DCIS'07 (US$ 3,000), IECON'07 (US$ 3,000), Tohoku U (US$ 5,000), MWSCAS'07 (US$ 1,000), IEEE-NANO'07 (US$ 1,000), ICSPC'07 (US$ 500), ICTRF'07 (US$ 500), IDT'07 (US$ 500), IWANN'07 (US$ 5,000), NanoMaterials'07 (US$ 500), Univ. Oslo (US$ 5,000)		51.4K$
2006 – 2011	• Center for Excellence in Intelligent Systems [InvestNI, IDF and U Ulster] Center for Neural Inspired Nano Architectures (~1.8MUK£, 2007–2010)	Co-PI	20.4MUK£
2007	– Mapping the proxel method to reliability analysis of nanoarchitectures [UAEU]	Co-PI	8KAED
2006	– Short term travel grants (invited): NSF (US$ 5,000), WNEC'06 (US$ 2,500), IDT'06 (US$ 500), AICCSA'06 (US$ 500)		8.5K$
2006	– Investigation of the reliability of single electron technology gates & circuits [UAEU]	Co-PI	8KAED
2005	– Short term travel grants (invited): ICM'05 (US$ 3,000), U Ulster (US$ 9,000), SNB'05 (US$ 3,000), IIT'05 (US$ 1,000)		16K$
2005 – 2006	• Defect-tolerant high-performance low-power computing with hybrid CMOS molecular circuits [Advanced Research & Development Agency, ARDA]	Co-PI	100K$
2004	– Short term travel grants (invited): ASAP'04 (US$ 500), NGCM'04 (US$ 1,000), IJCNN'04 (US$ 500), Heinz Nixdorf Inst. (US$ 1,500)		3.5K$
2003	– Short term travel grants (invited): MWSCAS'03 (US$ 500), ICNNSP'03 (US$ 500), NIPS'03 (US$ 500), U Paderborn (US$ 1,500), IJCNN'03 (US$ 500), IWANN'03 (US$ 500), NCI'03 (US$ 500), Heinz Nixdorf Inst. (US$ 2,000)		6.5K$
2002 – 2004	• Direct Digital Frequency Synthesizers (DDFSs) for reconfigurable communication systems. DDFSs have been investigated and implemented in silicon-on-insulator (SOI) and CMOS for space applications [Air Force Research Lab/CDADIC]	Co-PI	250K$
2002	– Short term travel grant (invited): LANL, Los Alamos (US$ 5,000)		5K$
2001	– Short term travel grant (invited): Berkeley Wireless Research Center (US$ 4,000)		4K$
2000 – 2003	• Conducting research on ultra-fast low-power floating point units (FPUs), with applications to graphic accelerators and gaming workstations [Rose Research]	PI	500K$
2000 – 2003	• Evaluating/examining solutions for ultra-fast low-power en/decryption allowing for wire-speed (i.e., on-the-fly) VeloCypher™ crypto-processors [Rose Research]	PI	500K$
1999 – 2005	• Pioneered *FastLogic*, an enabling VLSI technology based on novel ultra-fast logic gates, and a systematic design methodology for using them. Low-power was achieved by means of a novel self-timed power-down mechanisms, as well as differential (charge recycling) circuits. Several versions of *FastLogic* gates have been designed, simulated, tested, and patented (during 1999-2001). Ultra-low power sub-threshold versions have also been designed using an original cross-coupled adaptive body biasing scheme for boosting reliability. [Rose Research]	PI	3M$

1999 – 2002	• Exploring alternatives and improving on ultra-fast low-power multiplication and multiply-accumulate with application to digital signal processing [Rose Research]	PI	1M$
1999	– Short term travel grant (invited): AMS-SMM'99 (US$ 500)		0.5K$
1998 – 1999	• Researched, analyzed and enhanced ultra-fast VLSI adders. The theoretical results obtained have been verified and patented. [Rose Research]	PI	500K$
1998	– Short term travel grants (invited): NC'98 (US$ 500), CNRS-Paris (US$ 1,000), PARELEC'98 (US$ 500), EIS'98 (US$ 1,000)		3K$
1997	– Short term travel grants (invited): SBRN'97 (US$ 5,000), IDIAP, Switzerland (US$ 2,000), Heinz Nixdorf Inst. (US$ 1,500), U Paris XII (US$ 1,000), Royal Holloway U (US$ 1,000), Oxford U (US$ 1,000), NEuroTop'97 (US$ 600)		12.1K$
1996 – 1998	• Field Programmable Neural Arrays (FPNAs) as a component of the Deployable Adaptive Processing Systems (DAPS) [Los Alamos National Lab]	PI	180K$
1996	– Short term travel grants (invited): ANITA'96 (US$ 1,500), SBRN'96 (US$ 2,500), AT'96 (US$ 500)		4.5K$
1995	– Short term travel grants (invited): ADT'95 (US$ 500)		0.5K$
1994 – 1996	• Programmable Neural Arrays, Design & VLSI Implementation of Neural Networks Using Threshold Gates [EU CHBICT941741]	PI	440K$
1994	– Short term travel grants (invited): ConTI'94 (US$ 300), EMCSR'94 (US$ 300), RRCS'94 (US$ 500)		1.1K$
1993	– Short term travel grants (invited): ROSYCS'93 (US$ 300), ESSAN'93 (US$ 600)		0.9K$
1992	– Short term travel grant (invited): EPFL (US$ 500)		0.5K$
1991	– Short term travel grants (invited): ICIAM'91 (US$ 1,500), ICANN'91 (US$ 1,500)		3K$
1990 – 1991	– Negotiated, won, managed, and coordinated SPRING Software Consult contracts		
	» Dedicated En/Decryption and GUI [Ministry of National Defense]	PI	20K$
	» CAD Training (lectures) [AVERSA SA]	PI	5K$
	» Software Package for Microbusiness [Chemistry Research Institute]	Co-PI	10K$
	» Data Acquisition CAD Package [Chemistry Research Institute]	PI	10K$
	» PC Training (lectures) [Ministry of National Defense]	PI	5K$
1990	– Short term travel grant (invited): PARCELLA'90 (US$ 300)		0.3K$
1988	– Dedicated watch-dog system: Feasibility study & reliability analysis [Electrical Networks Institute]	PI	50K$
1987 – 1988	– Studied and analyzed Prolog as a research tool for circuit simulations [UPB]	Co-PI	
1987	– Short term travel grant (invited): ComEuro'87 (US$ 400)		0.4K$
1987	– Dedicated Database Package [National Information & Documentation Institute]	PI	50K$
1987	– Hierarchical Self-testable and Self-repairable Content Addressable Memory [UPB]	PI	50K$
	– High Speed Antialiasing Cascadable Circuit [UPB]	PI	50K$
1984 – 1987	– VLSI CAD Package (PC version) [UPB]	PI	100K$
	– Automatic Conical Ball Bearing Sorter [Bearings Factory Alexandria, now Koyo]	PI	100K$
1983	– Mutual exclusion circuit (patented) [Research Institute for Computer Techniques]	PI	
	– Floppy disk interface [Research Institute for Computer Techniques]		
1981 – 1982	– Ultra high-speed floating point unit. New improved algorithms with innovations at the microprogramming level [Research Institute for Computer Techniques]	PI	
1981	– Ultra high-speed highly reliable central processing unit with enhancements at the microprogramming level [Research Institute for Computer Techniques]	PI	
1980	– Involved in the final testing stages of the CE-100 computer (PDP equivalent)	Co-PI	
1979 – 1980	– High speed graphic workstation: 1024×1024 with 16 intensities [UPB]		5K$
	20 MHz HP vectorial display and original CPU design (tested at 60 MHz)		
	» Three Best Paper Awards at the Students' Scientific Research Conference		
	» Best MSc Thesis Award for *"innovations in workstation design"*		
1977 – 1980	– National Merit Scholarship [Ministry of Science & Education]		10K$

Research participated

1996 – 1998 – The Deployable Adaptive Processing Systems (DAPS) carried out at Los Alamos National Laboratory (LANL) was an R&D program, developing algorithms and prototyping systems for real-time remote/autonomous processing. Specified/designed neural-inspired algorithms and mapped them on FPGAs.

1992 – 1994 – VLSI-efficient threshold logic gates (Concerted Research Action of the Flemish Community).

1991 – One of the experts of DEANNA (Data-base for European Artificial Neural Network Activity), an ESPRIT exploratory action led by JENNI (Joint European Neural Network Initiative).

Other research related activities

20 Patents

- 10 USA, 3 WIPO, 3 Australia, 3 Taiwan, 1 Romania — ***single author on all of them***

138 Conferences Organized

- RRCS'94, ANITA'96, NEuroFuzzy'96, NeuroTop'97, SBRN'97, EIS'98, SOCO'99, EIS'00, SBRN'00, IWANN'03, NCI'03, IJCNN'04, IJCNN'05, NanoArch'05, ICMENS'06, IDT'06, IEEE-NANO'06, IEEE SoC'06, IJCNN'06, NanoArch'06, WSC-11, IDT'07, IIT'07, IEEE SoC'07, IJCNN'07, MCSoC'07, NanoArch'07, WSC-12, DCS'08, IDT'08, MIM-MMN'08, NanoArch'08, NDCS'08, VTS'08, WSC-13, DTIS'09, ICMLA'09, IJCNN'09, MIM-MMN'09, NanoArch'09, NanoNet'09, WSC-14, BCN'10, BIONETICS'10, ICTITA'10, IDT'10, MIM-MMN'10, MCSoC'10, NanoArch'10, NanoNet'10, SBCCI'10, WAC'10, WSC-15, ICMLA'11, IDT'11, MIM-MMN'11, MoNaCom'11, NaBIC'11, NanoArch'11, SBCCI'11, ISIE'12, MIM-MMN'12, MoNaCom'12, NaBIC'12, NanoArch'12, OPTIM'12, SBCCI'12, WICT'12, WSC-16, DTIS'13, ICECS'13 (*track chair*), IDT'13, IIT'13, IJCNN'13, MIM-MMN'13, MoNaCom'13, NanoArch'13, SBCCI'13, VLSI-SoC'13, BICT'14, BioTL'14, DTIS'14, I4CT'14, ICECS'14 (*track chair*), ICNC'14, IIT'14 (*chair*), IDT'14, ISCAS'14, MIM-MMN'14, NanoArch'14, NanoCom'14, SBCCI'14, SSCI'14, WSC-18, DTIS'15, ECCTD'15, ICECS'15 (*track chair*), IDT'15, IJCNN'15, MIM-MMN'15, NaBIC'15, NanoArch'15, NanoCom'15, SBCCI'15, SSCI'15, DTIS'16, ICCCC'16, ICECS'16 (*publicity chair*), IDT'16, ISCAS'16, MIM-MMN'16, SETIT'16, SOFA'16, DTIS'17, ISCAS'17, ICML'17, ISPACS'17, SoCPaR'17, DTIS'18, ICCCC'18, ISREIE'18, SETIT'18, SOFA'18, WSC'18, DTIS'19, ECC'19, VTCA'19, DTIS'20, ICCCC'20, MWSCAS'20, SOFA'20, ICCCC'22, SOFA'22, MWSCAS'22, MWSCAS'23, MWSCAS'24, MWSCAS'25, IOCMA'26

68 Sessions Chaired

- CSCS'93, ROSYCS'93, RRCS'94, ConTI'94, ADT'95, CSCS'95, IWANN'95, NeuroTop'97, CSCS'97, EANN'97, SOCO'97, EIS'98 (2×), PARELEC'98, NC'98, ISCAS'00, MWSCAS'00 (2×), NCI'03 (2×), IWANN'03, ICANN'03, SCS'03, IJCNN'03, NIPS'03 (2×), MWSCAS'03, IJCNN'04 (2×), IJCNN'05, IIT'05, VLSI-SoC'05, ICM'05, AICCSA'06 (2×), IIT'06, ISMVL'07, IWANN'07, IEEE-NANO'07, DCIS'07, GCoE'07, ARC'08, GCoE'08, ISCAS'08, ARC'09, NanoNet'09, IDT'10, IEEE-NANO'11, EDCC'12, IEEE-NANO'12, DTIS'13, ICECS'13 (3×), IIT'14, ICCCC'16, SOFA'16 (2×), ISREIE'16, ICCCC'18, ISREIE'18, SOFA'18, ECC'19 (2×), ICCCC'20, SOFA'20, ICCCC'22, SOFA'22

249 Invitations

- 14 sessions/workshops, 31 plenary/keynote, 19 tutorials, 66 lectures, and 119 presentations

Reviewer

- USA National Science Foundation (28× since 2002), EU European Commission (6× since 2007), Belgium (2005, 2009), Cyprus (2009, 2010), Switzerland (2006, 2008), UAE (12×), Romania (29×)
- Journals: IEEE T. Nano., Nanotech., J. Nanotech., ACM JETC, IEEE T. VLSI, IEEE T. CAS, IEEE T. Design & Test, IEEE T. CAD, IEEE T. Comp., IEEE T. Sys. Man & Cyber., Microelectr., Integr. VLSI J., Electr. Lett., J. VLSI, J. Circ. Th. & Appls., Solid State Electr., IEEE T. Neural Nets, Neural Nets., Neural Net. World, Neural Proc. Lett., Intl. J. Neural Syst., Microelectr. J., New J. Phys., Biol. Cyber.
- Conferences (besides those organized): ADT'95, IJCNN'03, IIT'05, IWANN'05, IIT'06, ISCAS'06, ICSPC'07, ISIE-07, ISCAS'07, VTS'07, IECON'08, ISCAS'08, IJCNN'08, IECON'09, ICMLA'09, IIT'09, ISIE'10, ISSCI'10, MWSCAS'10, Optim'10, ECCTD'11, IEEE-NANO'11, IIT'11, IJCNN'11, MoNaCom'11, ESANN'12, IDT'12, IIT'12, IJCNN'12, DTIS'13, ADVCIT'14, I4CT'14, IJCNN'14, ISCAS'15, WSC'15, MWSCAS'17, SoCPar'17, MWSCAS'18, MWSCAS'19, MWSCAS'22
- Intl. Assoc. Sci. Tech. Dev. (IASTED), Intl. Soc. Mini & Microcomp. (ISMM), Intl. Comp. Sci. Conventions (ICSC), Natl. Info. & Documentation Inst. (INID)
- Books (5), Committee member PhD theses (16), Committee member MSc theses (6)

RESEARCH PLANS

"Success … going from failure to failure with undiminished enthusiasm." Winston Churchill

SHORT TO MEDIUM TERM

- *Atto-Joule designs based on novel enabling **reliability-optimal arrays** of devices*
- *Practical (economical) fault-tolerant communication and computations (i.e., both devices and wires)*
- *Beyond CMOS reliability-power-delay designing (SET, NEMS, magnetic, molecular, photonic, fluidic)*

LONG TERM

- ***Bio-/brain-inspired nano-circuits/architectures for innovative information processing***

BIO-INSPIRED NANO-CIRCUIT ARCHITECTURES

– Designing innovative adaptive bio-/brain-inspired VLSI circuits and nano-architectures, allowing for low-power (near-threshold, mixed digital/analog, SET, NEMS, photonic, fluidic) and fault-tolerant (novel device-level redundancy schemes) large scale array-based information processing systems.

HIGH LEVEL AUTOMATIC SYNTHESIS

– Biological computing blocks rely on a few bits, suggesting digit-wise computations in a base larger than two. Low-precision 'analog' blocks could be synthesized base on Kolmogorov's superposition. The outputs of 'analog' blocks should be combined by cyclic (i.e., with feedback) digital circuits. This could interface directly to analog inputs, and would also merge memory with computations.

ACCURATE EDA ALGORITHMS FOR RELIABILITY

– Reliability calculations should start from devices and wires (not from gates), and modeling should include device variations, defects, and noises. GREDA (Gate Reliability EDA) was developed for very accurate gate reliability estimates. GREDA's results were taken to the system level by CR-EDA[2] (Circuit Reliability EDA for Evaluating Design Alternatives). Both tools are Bayesian-based and consider input vectors, device variations, and noises. Noises on wires and various non-Gaussian distributions have been investigated jointly with novel (patentable) statistical design concepts.

APPLICATIONS

SMART ASSOCIATIVE MEMORIES

– An interesting application is represented by smart/associative memory. A content addressable memory (CAM) is looking for an exact match. Typical examples include: the cache and the virtual page addressing (microprocessors), and the address lookup (Internet servers). A bio-inspired associative memory relies on best-match, returning one or more matches sorted by a given metric. Advantages: could deal with missing data and errors, could generalize, etc.

HIGH-PERF EN/DECRYPTION EN/DECODING

– The plan here is to evaluate solutions for ultra-fast en/decryption allowing for wire-speed implementation of public-key (e.g., RSA, ECC) and symmetric key (e.g., AES) cryptosystems. Algorithms for en/decoding (e.g., JPEG, MPEG, etc., based on FFT/DCT) should also be targeted.

AWARDS

"Results! … I know several thousand things that won't work." Thomas Edison

4 PROFESSORSHIPS

2026	• Professor Emeritus	"Aurel Vlaicu" University of Arad (26.09.2026)	
2015	• Visiting Professor (Erasmus Mundus)	European Union (TU Dresden/CfAED)	
2013	• Visiting Professor (Nano Scholar)	European Union (TU Dresden/CfAED)	
2005 – 2011	• Visiting Professor	Ulster University (UK)	

5 FELLOWSHIPS

1999 – 2001	• Rose Research Fellowship	Rose Research (USA)	0.1%
1996 – 1998	• Director's Postdoctoral Fellowship	Los Alamos National Laboratory (USA)	1.0%
1994 – 1996	• HCM Research Fellowship	European Union (King's College London, UK)	0.1%
1993 – 1994	• Research Fellowship	Concerted Research Action (Flemish Community)	
1991	• Fulbright Fellowship	Fulbright Commission (USA)	0.1%

2 SCHOLARSHIPS

1991 – 1993	• Doctoral Scholarship	Katholieke Universiteit Leuven (Belgium)	1.0%
1975 – 1980	• National Merit Scholarship	Ministry of Science & Education (Romania)	0.1%

OTHER RECOGNITIONS

2025	• *Top 2% scientists worldwide*	Stanford & Scopus (10.17632/btchxktzyw.8)	2.0%
2025	• Excellence Award	Gala Elitelor Aradene	
2024	• *Top 2% scientists worldwide*	Stanford & Scopus (10.17632/btchxktzyw.7)	2.0%
2023	• *Top 2% scientists worldwide*	Stanford & Scopus (10.17632/btchxktzyw.6)	2.0%
2023	• UEFISCDI PRECISI Award	IEEE Transactions on Nanotechnology (Q2)	
2022	• Excellence Award	UAV	1.0%
2022	• *Top 2% scientists worldwide*	Stanford & Scopus (10.17632/btchxktzyw.5)	2.0%
2022	• UEFISCDI PRECISI Award	Networks (Q1)	
2021	• *Top 2% scientists worldwide*	Stanford & Scopus (10.17632/btchxktzyw.4)	2.0%
2020	• *Top 2% scientists worldwide*	Stanford & Scopus (10.17632/btchxktzyw.3)	2.0%
2020	• UEFISCDI PRECISI Award	IEEE Communications Letters (Q2)	
2020	• Best Paper Award	ICCCC'20	2.0%
2018	• UEFISCDI PRECISI Award	IEEE Access (Q1)	
2018	• Best Paper Award	IEEE ICCCC'18	2.0%
2017	• UEFISCDI PRECISI Award	Optics Express (Q1)	
2017	• Excellence Award	UPB	1.0%
2016	• Excellence Award	UAV	1.0%
2009	• Research Affairs Recognition Award	UAEU	1.0%
2009	• Best Excellence in Scholarship Award	UAEU, College of IT	2.0%
2008	• Best Paper Award	UAEU Annual Research Conference	1.0%
2003	• Three Patents		
2002	• Nine Patents		
2001	• US resident under extraordinary ability *"VLSI implementations of neural networks"*		
2001	• Seven Patents		
2000	• Best Paper Award	IEEE CAS'2000	1.0%
1996	• Senior Member	IEEE	8.0%
1994	• PhD *summa cum laude*	Katholieke Universiteit Leuven (Belgium)	5.0%
1984	• One Patent	Romanian PTO	
1980	• Best MSc Thesis Award	UPB	1.0%
1980	• Best Paper Awards (three times)	UPB	1.0%
1977	• Best Paper Awards (two times)	University "Politehnica" of Bucharest (UPB)	1.0%
1975	• Highest Award (at graduation)	National College of Informatics	0.5%
1971 – 1975	• Gold Medal/First Prize (four times)	Romanian Physics Olympiad	0.1%

ADDITIONAL INFORMATION

MEMBERSHIP

1999	– Marie Curie Fellowship Association	MCFA
	– Association for Computing Machinery (#5155023)	ACM
1992	– Institute of Electrical and Electronics Engineering (#03089455) – ***Life Senior Member***	IEEE
	– International Neural Network (#7212)	INNS
1991	– European Neural Network Society – ***Founding Member***	ENNS
	– Expert of the Romanian Academy of Science	
1979	– Lions Club International (Centre International de Rencontres Universitaire)	CIRU

MISCELLANEOUS

2019 – 2024	UAV	Faculty of Exact Sciences College Council	Member
2017 – 2018	MEN	CNATDCU (Ministry of Education Decree nr. 3991/06.06.2017)	*Member*
2013 – 2015	UAEU	Promotion Advisory Group	Member
2009 – 2015	UAEU	Mubadala Technology (previously ATIC) Advisory Board	Member

2013 – 2015	CIT	Promotion Committee	*Chair*
2005 – 2013	CIT	Promotion Committee (except 2007 – 2008)	Member
2014 – 2015	CIT	Peer Evaluation of Teaching (PET) Committee	Member
2010 – 2013	UAEU	Council (representing CIT)	Member
2008 – 2013	UAEU	Graduate Research Studies Board	Member
2008 – 2011	UAEU	Graduate Council	Member
2007 – 2009	UAEU	Technical Task Force (inspecting and receiving the new CIT building)	Member
2006 – 2010	UAEU	Research Affairs Committee	Member
2006 – 2007	UAEU	IT Receiving Committee	Member
2011 – 2013	CIT	Research Committee	Member
2011 – 2012	CIT	Graduate Program Committee	Member
2009 – 2011	CIT	Graduate Program Committee	*Chair*
2005 – 2011	CIT	Research & Graduate Studies Committee	*Chair*
2005 – 2008	CIT	Laboratories & Equipment Committee	*Chair*
2005 – 2006	CIT	Recruitment Committee	*Chair*
2006 – 2011	CIT	Strategic Planning Committee	Member
2006 – 2010	CIT	Recruitment Committee	Member
2006 – 2009	CIT	Honors Committee	Member
2006 – 2007	CIT	Academic Performance Assessment Committee	Member
2005 – 2011	CIT	College Council	Member
2005 – 2008	CIT	Curriculum Committee	Member

2024	External examiner for a PhD thesis (member of the examination committee)
2022	External examiner for two PhD theses (member of the examination committee)
2009	External examiner for a PhD thesis (member of the examination committee)
2008	External examiner for four PhD theses (member of the examination committee)
2007	External examiner for a PhD thesis (member of the examination committee)
	External examiner HCT Men's College, Abu Dhabi (9 students, 4 projects)
2006	External examiner for a PhD thesis (member of the examination committee)
2005	External examiner for a PhD thesis (member of the examination committee)

[…]

2001 – 2005	• Member of the EECS Graduate Studies Committee	WSU
2001 – 2005	• Member of the Computer Engineering (Program) Committee	WSU
1998 – 2001	• International Computer Science Conventions/Academic Advisory Board	ICSC
1997 – 1998	• *Program Chairman* of the IEEE Los Alamos Section	LANL
1985 – 1990	• *Secretary* of the MSc Examination Board	UPB
1987 JULY	– *Chair* of the Students' National Computer Training Camp (Sinaia, Romania)	UPB
1985 – 1990	– *Chair* of the Students' Group for Scientific Computer Research	UPB

2025 – …	• *Editorial Board*	Romanian Journal of Mathematics & Computer Science	UTCB
2022 – …	• *Editorial Board*	Frontiers in Neuro Science	Frontiers
2021 – …	• *Editorial Board*	Mathematics	MDPI
2020 – 2025	• *Editorial Board*	Applied Sciences	Springer
2010 – 2016	• *Associate Editor*	Nano Communication Networks	Elsevier
2011 – 2015	• *Associate Editor*	IEEE Transactions on VLSI Systems	IEEE
2009	• Emerging Technologies Group on Nanoscale Communications		IEEE
2005 – 2008	• *Associate Editor*	IEEE Transactions on Neural Networks	IEEE
2006 –	• Established and leading *Nano-ART = Nano Architectural Research Team*		
2005	• Task Force on Nano Architectures		IEEE-CS
2003	• Member of the Novel Nanoarchitectures Study Group CW4		SRC-NNI

2025 reviews	–						32 journals	11 conferences
2024 reviews	–					1 PhD	59 journals	8 conferences
2023 reviews	–					1 PhD	36 journals	2 conferences
2022 reviews	–		10 Romania			2 PhD	33 journals	8 conferences
2021 reviews	–		5 Romania			1 PhD	15 journals	12 conferences
2020 reviews	–		1 Romania				16 journals	18 conferences
2019 reviews	–		1 Romania				7 journals	8 conferences
2018 reviews	–		2 Romania				17 journals	14 conferences
2017 reviews	–		3 Romania				5 journals	9 conferences
2016 reviews	–		9 Romania				2 journals	22 conferences
2015 reviews	–						8 journals	42 conferences
2014 reviews	– 1 NSF						30 journals	45 conferences
2013 reviews	– 1 NSF						31 journals	58 conferences
2012 reviews	–					2 MSc	33 journals	46 conferences
2011 reviews	– 7 NSF	2 EU					19 journals	31 conferences
2010 reviews	–	1 EU		1 Cyprus			14 journals	24 conferences
2009 reviews	–	1 EU	1 Belgium	1 Cyprus		1 PhD	13 journals	25 conferences
2008 reviews	– 8 NSF	1 EU	1 Switzerland			4 PhD	15 journals	33 conferences
2007 reviews	– 9 NSF	1 EU			1 book	1 PhD	9 journals	28 conferences
2006 reviews	– 1 NSF		1 Switzerland		2 books	1 PhD	15 journals	15 conferences
2005 reviews	– 1 NSF		1 Belgium		1 book	1 PhD	5 journals	11 conferences

[…]

LINKS

TO PRESENTATIONS / PUBLICATIONS

2020
- Employing Sorting Nets for Designing Reliable Computing Nets
  IEEE International Conference on Nanotechnology, virtual, July 29-31, 2020
  https://ieeetv.ieee.org/ondemand/employing-sorting-nets-for-designing-reliable-computing-nets

2020
- Land of the Giants … AI Chips
  International Conference on Computers Communications & Control ICCCC'20
  Baile Felix/Oradea, Romania, May 11-15, 2020
  https://www.univagora.ro/upload/redactor/document/beiu-1077.pdf

2014
- Bio-Inspired Designing with Arrays
  CMOS Emerg. Tech. Res. CMOSETR'14, Grenoble, France, July 8, 2014
  https://books.google.ca/books?id=OL3aAwAAQBAJ&pg=PA102

2013
- Why Biology Can … and … Silicon Can't?
  TUDresden, Germany, July 11, 2013, https://nano.tu-dresden.de/seminar/2013_07_11_valeriu-beiu
- The Brain – A Gentle Introduction Clearing Misconceptions
  TUDresden, Germany, April 11, 2013, https://nano.tu-dresden.de/seminar/2013_04_11_valeriu-beiu

2010
- On Brain Inspired Nano Interconnects (tutorial)
  IEEE Intl. Joint Conf. Neural Nets. IJCNN'10, Barcelona, Spain, July 18, 2010
  https://cis.ieee.org/activities/educational-activites/video-library
  https://ieeetv.ieee.org/player/embed_play/130009/videowidth
  https://ieeetv.ieee.org/player/embed_play/130008/videowidth
- Trustworthy Wings of the Mysterious Butterflies
  Intl. Nanotech. Conf. INC6, Grenoble, France, May 19, 2010

Since 1996
- Los Alamos National Laboratory (publications)
  https://www.osti.gov/search/semantic:Beiu

RELATED TO VITA

1971 – 1975	• "Tudor Vianu" National College of Informatics	http://portal.lbi.ro/
1975 – 1980	• University "Politehnica" of Bucharest	https://upb.ro/en/
	Faculty of Control & Computers	https://acs.pub.ro/en/
	CS&E Department	https://cs.pub.ro/
	MSc supervisor	https://ro.wikipedia.org/wiki/Mircea_Petrescu
1980 – 1982	• Research Institute for Computer Techniques	https://www.itc.ro/
1982 – 2001	• University "Politehnica" of Bucharest	https://upb.ro/en/
	Faculty of Control & Computers	https://acs.pub.ro/en/
	CS&E Department	https://cs.pub.ro/
1991 – 1994	• Katholieke Universiteit Leuven	https://www.kuleuven.be/english/
	Faculty of Engineering	https://eng.kuleuven.be/en
	EE Department (ESAT)	https://www.esat.kuleuven.be/english/
	PhD supervisor	https://www.kuleuven.be/wieiswie/en/person/00009485
1994 – 1996	• King's College London	https://www.kcl.ac.uk/
	School of Natural & Mathematical Sciences	https://www.kcl.ac.uk/nmes/
	Department of Mathematics	https://www.kcl.ac.uk/mathematics/
	Centre for Neural Networks	https://www.kcl.ac.uk/mathematics/about/history-of-the-department
	Scientific advisor/mentor	https://en.wikipedia.org/wiki/John_G._Taylor
1996 – 1998	• Los Alamos National Laboratory	https://www.lanl.gov/
	Nonproliferation and International Security	http://nis-www.lanl.gov/ [old link; archived]
1998 – 2001	• RN2R/Rose Research LLC	https://patents.justia.com/assignee/rn2r-l-l-c
2001 – 2005	• Washington State University	https://wsu.edu/
	School of EE&CS	https://school.eecs.wsu.edu/
2005 – 2011	• University of Ulster	https://www.ulster.ac.uk/
	Intelligent System Research Centre	https://www.ulster.ac.uk/research/topic/computer-science/intelligent-systems-research-centre
2005 –	• United Arab Emirates University	https://www.uaeu.ac.ae/en/
	College of Information Technology	https://www.uaeu.ac.ae/en/cit/
	https://research.uaeu.ac.ae/en/searchAll/index/?search=Beiu	
2015 –	• "Aurel Vlaicu" University of Arad	https://uav.ro/en/
	Faculty of Exact Sciences	https://stiinteexacte.uav.ro/en/

PUBLICATIONS	310	38 INVITED AND 8 BEST PAPER AWARDS (BESIDES 53 OTHER CONFS. AND 73 TECH. REP.)		
CITATIONS	2112	HAND COUNTED (EXCLUDING SELF-CITATIONS) – UPON REQUEST	PUBLICATIONS	H INDEX
~1100/750	1108/746	**Web of Science** (all/excluding self-citation all databases)	176	15
		https://www.webofscience.com/wos/author/record/797306 (partial as free)		
~1600	1590	**Scopus** (all, i.e., including self-citations)	188	18
		https://www.scopus.com/authid/detail.uri?authorId=57208794980 (partial as free)		
~2000	2030	**OpenAlex** (all, i.e., including self-citations)	257	20
		https://openalex.org/authors/A5103819348		
~2200	2212	**Semantic Scholar** (all, i.e., including self-citations)	251 (73 HIC)	22
		https://www.semanticscholar.org/author/Valeriu-Beiu/50582498		
~3200	3196	**Google Scholar** (all, i.e., including self-citations)	333	27
		https://scholar.google.com/citations?user=u_PrdFwAAAAJ		

VALERIU BEIU — INVITED

INVITED	ORGANIZED/PRESENTED	PENDING
SESSIONS/WORKSHOPS	14	
KEYNOTE/PLENARY/PANEL	31	
TUTORIALS	19	
LECTURES/SEMINARS	66	
PRESENTATIONS	73	
PRESENTATIONS TO INDUSTRY	46	
TOTAL	249	

INVITED SESSIONS/WORKSHOPS 14

S_{14} L. Daus, R.-M. Beiu, and V. Beiu
Trustworthy & Green Design — Session
International Conference on Computers, Communications and Control ICCCC 2022
Baile Felix, Oradea, Romania, May 16-20, 2022

S_{13} M. Jianu, V.-F. Dragoi, and V. Beiu
Rebooting Reliability – From Maths to Circuits — Session
International Workshop on Soft Computing Applications SOFA 2020
Virtual conference (https://www.sofa-org.eu/2020/), November 27-29, 2020

S_{12} V. Beiu: On Brain-Inspired Nano-Architectures — Session
International Conference on Computers, Communications and Control ICCCC'20
Virtual conference, May 11-15, 2020

S_{11} V. Beiu: On Brain-Inspired Nano-Architectures — Session
IEEE International Conference on Computers, Communications and Control ICCCC'18
Baile Felix, Oradea, Romania, May 08-12, 2018

S_{10} R. Andonie, D. Davendra, and V. Beiu
Computational Intelligence Methods — Session
IEEE International Conference on Computers, Communications and Control ICCCC'16
Baile Felix, Oradea, Romania, May 10-14, 2016

S_{9} V. Beiu, and W. Ibrahim
Towards Brain Inspired Interconnects and Circuits — Workshop
International ICST Conference on Nano-Networks Nano-Net'09
Luzern, Switzerland, October 18, 2009. https://eudl.eu/proceedings/TBIC/2009?articles_page=1

S_{8} M.J. Avedillo, J.M. Quintana, and V. Beiu
Emerging Technologies Applied to Nanoelectronics — Session
IEEE International Conference on Design of Circuits and Integrated Systems DCIS'07
Seville, Spain, November 22, 2007

S_{7} U. Rückert, and V. Beiu
Neural Inspired Architectures for Nanoelectronics — Session
International Work-Conference on Artificial Neural Networks IWANN'07
San Sebastian, Spain, May 19, 2007

S_{6} V. Beiu, and U. Rückert
Brain Inspired Emerging Nanoarchitectural Design and Technical Challenges — Session
IEEE International Joint Conference on Neural Networks IJCNN'04
Budapest, Hungary, July 28, 2004

S_5 V. Beiu, and U. Rückert
Neural-inspired Architectures for Nanoelectronics — Workshop
Neural Information Processing Systems NIPS'03
Whistler, Canada, December 12-13, 2003

S_4 V. Beiu: Threshold Gates – Past, Present, and Future — Session
International Work-Conference on Artificial Neural Networks IWANN'03
Menorca, Spain, June 4, 2003

S_3 V. Beiu: The Next Generation of Neural Networks Chips — Session
International ICSC Symposium on Engineering of Intelligent Systems EIS'98
Tenerife, Spain, February 9, 1998

S_2 R. Andonie, and V. Beiu
International Workshop on Neural Research Priorities NeuroTop'97 — Workshop
Braşov, Romania, May 27-28, 1997

S_1 V. Beiu, and R. Andonie
Shaping the Hardware Solutions for the Third Millennium ANITA'96 — Workshop
Uppsala, Sweden, December 9-10, 1996

INVITED KEYNOTE/PLENARY/PANEL 31

K_{31} V. Beiu: When Robots Got Sauce — Keynote
International Students' Conference StudMath-IT 2025
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, November 17-18, 2025

K_{30} V. Beiu: An Unexpected Twist on the Brain: We Need to Reassess Connectomics — Keynote
International Conference on Mathematics, Computer Science & Technical Education (ICMCSTE 2024)
Bucharest, Romania, May 24-26, 2024 (https://dmi.utcb.ro/icmcste/)

K_{29} V. Beiu: Quo Vadis Connectomics — Keynote
Conference on „Brain, Neurosciences and Society" (BAW2024)
Arad, Romania, March 12, 2024
https://www.uav.ro/academic/cercetare-stiintifica/apeluri-conferin%C8%9Be/brain-awareness-week-2024

K_{28} V. Beiu: A Brave New World … Manufactured with Atomic Precision — Keynote
International Workshop on Soft Computing Applications SOFA2022
Arad, Romania, November 21-23, 2022 (https://2022.sofa-org.eu/invited-speakers/)

K_{27} V. Beiu: A(nother) Game of Shadows — Keynote
International Conference on Computers, Communications and Control ICCCC'22
Baile Felix, Oradea, Romania, May 16-20, 2022
https://www.univagora.ro/en/conferinte/icccc/icccc2022/keynote-speakers/

K_{26} V. Beiu: The Unfolding Road from Dust to Trust — Keynote
International Conference Advances in 3OM, Timisoara, Romania, December 13-16, 2021
http://3om-group-optomechatronics.ro/advances-in-3om-conference-2021/plenary-speakers/

K_{25} V. Beiu: Chips (Shortages), Technology and Taxes — Plenary
International Students' Scientific Communications Session SICSS 2021
Arad, Romania, June 5, 2021 (https://issscarad2021.netlify.app/invitedSpeakers)

K_{24} V. Beiu: Why Reliability Is Such a Nemesis – Rebooting Computing Reliability — Keynote
International Workshop on Soft Computing Applications SOFA'20
Virtual conference, November 27-29, 2020 (https://www.sofa-org.eu/2020/)

K_{23} V. Beiu: Quantum AI from the Ground Up — Keynote
International Students' Conference StudMath-IT 2020
Virtual conference, November 26-27, 2020 (https://studmathit.uav.ro/2020/)

K_{22} V. Beiu: Rise of the AI Chips — Keynote
International Students' Scientific Communications Session SICSS 2020
Virtual conference, June 27, 2020 (https://issscarad2020.webnode.ro/invited-speakers/)

K_{21} V. Beiu: Land of the Giants … AI Chips — Keynote
International Conference on Computers, Communications and Control ICCCC'20
Virtual conference, May 11-15, 2020
https://www.univagora.ro/en/conferinte/icccc/icccc2020/keynote-speakers/

K_{20} V. Beiu: Why AI Hardware Makes (Perfect) Sense Now — Keynote
Euro-China Conference on Intelligent Data Analysis and Applications ECC'19
Arad, Romania, October 15-18, 2019 (https://www.ecc2019.ro/invited-speaker/)

K_{19} V. Beiu: Seeing is Believing — Keynote
International Workshop on Soft Computing Applications SOFA'18
Arad, Romania, September 15, 2018

K_{18} V. Beiu: Photonics and the Brain — Plenary
International Conference on Lasers in Medicine ICLM'17
Timisoara, Romania, July 15, 2017

K_{17} V. Beiu: Why the Brain Can and the Computer Can't — Keynote
International Workshop on Soft Computing Applications SOFA'16
Arad, Romania, August 25, 2016

– V. Beiu: Brain versus Computer Revisited — Keynote
Asia-Pacific Conference on Electrical Electronics and Engineering AEEE'15
Dubai, UAE, November 18-19, 2015 [Canceled]

K_{16} V. Beiu: On the Reliability Accuracy Challenge — Grappling with a Seemingly Intractable Problem — Keynote
European Dependable Computing Conference EDCC'12
Sibiu, Romania, May 11, 2012

K_{15} T.G. Noll, P. Horn, N. Menezes, V. Beiu, and D. Hammerstrom — Panel
Alternative Minimum-Energy Computing Paradigms (Brain-inspired Information Processors)
International Forum on Minimum Energy Electronic Systems MEES'10
Abu Dhabi, UAE, May 23-24, 2010

K_{14} V. Beiu: Trustworthy Wings of the Mysterious Butterflies (Brain-inspired Information Processing) — Keynote
International Nanotechnology Conference on Communication and Cooperation INC6
Grenoble, France, May 19, 2010

K_{13} V. Beiu: Connectivity and Scalability Issues for Biologically Plausible Nano-electronic Systems — Keynote
International Workshop on Brain-Inspired Electronic Circuits & Systems BIECS'09/ESSDERC'09
Athens, Greece, September 18, 2009

K_{12} C. Constantinescu, J.A. Abraham, V. Beiu, H. Naeimi, A. Somani, and S. Wang
Scaling Towards Nanometer Size Devices – Issues and Solutions — Panel
Workshop on Dependable and Secure Nanocomputing WDSN'09 (IEEE/IFIP DSN'09)
Estoril/Lisbon, Portugal, June 29, 2009
http://webhost.laas.fr/TSF/WDSN09/WDSN09_files/Slides/WDSN09_12-Beiu.pdf

K_{11} V. Beiu: Electrons Behaving Badly — Plenary
Information Electronics Systems Global Center of Excellence GCoE'08
Tohoku University, Sendai, Japan, July 14, 2008

K_{10} S. Bhabhu, R.A. Parekhji, M. Nicolaidis, V. Beiu, and M.Y. Zhang
Mitigating Reliability, Yield and Power Issues in Nano-CMOS: Design or EDA Problem? Panel
IEEE International VLSI Test Symposium VTS'08, San Diego, CA, USA, April 30, 2008

K_9 V. Beiu: Quo Vadis Nano-electronics Plenary
Information Electronics Systems Global Center of Excellence GCoE'07
Tohoku University, Sendai, Japan, November 27, 2007

K_8 V. Beiu: What Do Shannon, von Neumann, Kolmogorov, and Feynman Have to Do with ... Moore? Plenary
IEEE International Symposium on Multiple Valued Logic ISMVL'07
Oslo, Norway, May 14, 2007

K_7 V. Beiu: What Do Moore, von Neumann and Kolmogorov Have in Common? Keynote
IEEE International Conference on Computer Systems and Applications AICCSA'06
Sharjah, UAE, March 9, 2006

K_6 V. Beiu: The Quest for Reliable Nano Computations Plenary
IEEE International Conference on Microelectronics ICM'05
Islamabad, Pakistan, December 13, 2005

K_5 U. Rükert, and V. Beiu
Neural Inspired Architectures for Nanoelectronics Plenary
IEEE International Conference on Intelligent Computing and Information Systems ICICIS'05
Cairo, Egypt, March 5-7, 2005

K_4 V. Beiu: On Biological and Hardware Neural Networks Keynote
International Joint Meeting of the AMS and SMM
Denton, TX, USA, May 21, 1999

K_3 V. Beiu: 2D Neural Hardware vs 3D Biological Ones Plenary
International ICSC Symposium on Neural Computations NC'98
Vienna, Austria, September 22, 1998

K_2 V. Beiu: Neural Inspired Parallel Computations Require Analog Processors Plenary
International Conference on Parallel Computing and Electrical Engineering PARELEC'98
Bialystok, Poland, September 4, 1998

K_1 V. Beiu: How to Build VLSI-Efficient Neural Chips Keynote
International ICSC Symposium on Engineering of Intelligent Systems EIS'98
Tenerife, Spain, February 11, 1998

INVITED TUTORIALS *19*

T_{19} V. Beiu: The Race for Mighty AI Chips
IEEE International Conference: Sciences of Electronic, Technologies of Information and Telecommunications SETIT'22
Genoa, Italy & Sfax, Tunisia, May 28-30, 2022 (http://www.setit.rnu.tn/)

T_{18} V. Beiu: On Brain-Inspired Nano-Architectures
IEEE International Conference on Computers, Communications and Control ICCCC'18
Baile Felix, Oradea, Romania, May 08-12, 2018 (http://univagora.ro/en/icccc2018/keynote/)

T_{17} V. Beiu, S.R. Cowell, L. Dauş, and P. Poulin
The Brain and the Computer Revisited Once Again
IEEE International Nanotechnology Conference IEEE-NANO'16
Sendai, Japan, August 22, 2016
http://nano.papercept.net/conferences/conferences/NANO16/program/NANO16_ContentListWeb_1.html

T_{16} V. Beiu, P.M. Kelly, and W. Ibrahim
On Brain Inspired Nano Interconnects
IEEE International Joint Conference on Neural Networks IJCNN'10 (part of WCCI'10)
Barcelona, Spain, July 18, 2010
https://ieeetv.ieee.org/player/embed_play/130009/videowidth & /130008/videowidth

T_{15} V. Beiu, and P.M. Kelly
On Brain Inspired Interconnects for Nano-electronics
International ICST Conference on Nano-Networks Nano-Net'09
Luzern, Switzerland, October 19, 2009

T_{14} V. Beiu, and W. Ibrahim
On Reliability When Down to a Handful of Electrons
IEEE International Nanotechnology Conference IEEE-NANO'09
Genoa, Italy, June 27, 2009

T_{13} V. Beiu: On Brain Inspired Low-Power Redundant Designs for Silicon Nano-electronics and Beyond
IEEE Annual Conference of the Industrial Electronic Society IECON'07
Taipei, Taiwan, November 5, 2007

T_{12} V. Beiu: On Brain-Inspired Redundant Designs
IEEE International Conference on Design and Technology of Integrated Systems DTIS'07
Rabat, Morocco, September 2, 2007

T_{11} V. Beiu, and W. Ibrahim
Dealing with the Reliability Challenge for Semiconductor Nano-electronics and Beyond
IEEE International Midwest Symposium on Circuits and Systems MWSCAS'07
Montreal, Canada, August 5, 2007

T_{10} V. Beiu, and W. Ibrahim
Emerging Fault-Tolerant Designs for Novel Nano-Architectures
IEEE International Conference on Nanotechnology IEEE-NANO'07
Hong Kong, China, August 2, 2007

T_{9} V. Beiu, J. Nyathi, S. Aunet, and M.H. Sulieman
Femto Joule Switching for Nano Electronics
IEEE International Conference on Computer Systems and Applications AICCSA'06
Sharjah, UAE, March 8-11, 2006

T_{8} V. Beiu: Design Challenges for Nanoelectronics
International Conference on Innovations in Information Technologies IIT'05
Dubai, UAE, September 26-28, 2005

T_{7} V. Beiu, and S. Roy
Practical Redundant Designs for Nano Architectures – Novel Theoretical Results
International Symposium on Nano and Giga Challenges in Nanoelectronics NGCM'04
Krakow, Poland, September 17, 2004

T_{6} V. Beiu, J.M. Quintana, M.J. Avedillo, and P.-S. Wu
Threshold Logic – From Vacuum Tubes to Nanoelectronics
IEEE International Conference on Neural Networks and Signal Processing ICNNSP'03
Nanjing, China, December 14-17, 2003

T_{5} V. Beiu, J.M. Quintana, and M.J. Avedillo:
Threshold Logic – From TTL to Quantum Computing
IEEE International Joint Conference on Neural Networks IJCNN'03
Portland, OR, USA, July 20-24, 2003

T_4 V. Beiu: How to Build VLSI-Efficient Neural Chips
International ICSC Symposium on Engineering of Intelligent Systems EIS'98
Tenerife, Canary Islands, Spain, February 9-13, 1998

T_3 V. Beiu: Kolmogorov's Superpositions and New Mixed Analog/Digital Architectures
Brazilian Symposium on Neural Networks IV SBRN, Goiania, Brazil, December 4, 1997

T_2 V. Beiu: Entropy, Constructive Neural Learning, and VLSI Efficiency
International Workshop on Neural Research Priorities in Data Transmission and EDA NEuroTop'97
Braşov, Romania, May 27, 1997

T_1 V. Beiu: Overview of the Present State-of-the-Art of Hardware Implementations of Neural Networks
Brazilian Symposium on Neural Networks SBRN'96
Recife, Brazil, November 13, 1996

INVITED LECTURES/SEMINARS 66

L_{66} V. Beiu: From Class(room) to War (Battlefield) and Back
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, June 29, 2026

L_{65} V. Beiu: How Is History Being Written?
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, June 18, 2026

L_{64} V. Beiu: AI = (Nice) Conversations, (Sycophantic) Friends, and (Major) Threats
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, May 14, 2026

L_{63} V. Beiu: To Have or Have Not ... This is the Question – Part 3
"Aurel Vlaicu" University of Arad, Arad, Romania, April 27, 2026

L_{62} V. Beiu, C. Terei, and B. Datcu: To Have or Have Not ... This is the Question – Part 2
"Aurel Vlaicu" University of Arad, Arad, Romania, April 8, 2026

L_{61} V. Beiu, C. Terei, and B. Datcu: To Have or Have Not ... This is the Question – Part 1
"Aurel Vlaicu" University of Arad, Arad, Romania, March 11, 2026

L_{60} V. Beiu: AI, n-AI, dAI
IT&C Pedagogical Study Group of Arad: AI in Education: Challenges & Opportunities
Online meeting, Arad, Romania, December 17, 2025

L_{59} V. Beiu: Role of AI in Scientific & Educational Processes
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, November 20, 2025

L_{58} V. Beiu: A1 on Top of the World
Colegiul National „Dimitrie Ţichindeal," Arad, Romania, September 25, 2025

L_{57} V. Beiu: From Bio Intelligence to the Artificial One … or … from Chess, to Go, to LLM
Colegiul National „Elena Ghiba Birta," Arad, Romania, September 24, 2025

L_{56} V. Beiu: AI on Top of the World – Kolmogorov (Arnold) Redivivus
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, April 02, 2025

L_{55} V. Beiu: AI on Top of the World – Marching Towards Quantization
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, December 04, 2024

L_{54} V. Beiu: AI on Top of the World – The Year AI Got 1.5 Nobel
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, November 27, 2024

L_{53} V. Beiu: Obviously It's Open … AI
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, May 30, 2024

L_{52} V. Beiu: Quantum for the Masses
Faculty of Exact Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania, June 6, 2022

L_{51} V. Beiu: Chips (shortages), Technology and Taxes
International Students Scientific Communications Session SSCS'21, Arad, Romania, June 14, 2021

L_{50} V. Beiu: Rise of the AI Chips
International Students Scientific Communications Session SSCS'20, Arad, Romania, June 27, 2020

$L_{47\text{-}49}$ V. Beiu: Bio-Inspired Cellular Nano-Architectures
– International Students Scientific Communications Session SSCS'19, Arad, Romania, June 14, 2019
– Mærsk Mc-Kinney Møller Institute, South Denmark University, Odense, Denmark, October 11, 2018
– International Students Scientific Communications Session SSCS'17, Arad, Romania, June 7, 2017

L_{46} V. Beiu: Deciphering the Low Level Reliability Schemes of the Brain
Enabled by Abraham de Moivre, Edward F. Moore, and Claude E. Shannon
Department of Informatics Scientific Seminar, West University of Timisoara, Romania, March 8, 2017

L_{45} V. Beiu: From de Moivre to Moore-Shannon and Beyond
Reliability Schemes Revealed by Atomic Resolution Microscopy
Institute of Informatics Scientific Seminar, University of Szeged, Hungary, February 28, 2017

L_{44} V. Beiu: What's All the Fuss About the Brain?
CIT Graduate Seminar, UAEU, Al Ain, UAE, May 27, 2015

L_{43} V. Beiu: Revealing the Reliability Scheme of the Neurons – One Ion Channel at a Time
UAEU Cognitive Science Research Series, UAEU, Al Ain, UAE, May 24, 2015

L_{42} V. Beiu: If Biology Can … Why Can't Silicon? The Brain and the Computer
TU Dresden, Dresden, Germany, July 11, 2013
https://nano.tu-dresden.de/seminar/2013_07_11_valeriu-beiu

L_{41} V. Beiu: The Brain – A Gentle Introduction Clearing Misconceptions
TU Dresden, Dresden, Germany, April 11, 2013
https://nano.tu-dresden.de/seminar/2013_04_11_valeriu-beiu

L_{40} V. Beiu: From Ion Channels to Future Nano-Architectures — Beyond von Neumann Cellular Automata
Chalmers University, Gothenburg, Sweden, November 2, 2012

L_{39} V. Beiu: Bio-inspired Arrays to the Rescue — The Curse of Constant Failure Rates and Gaussian Distributions
Chalmers University, Gothenburg, Sweden, October 29, 2012

L_{38} V. Beiu: On the Reliability Accuracy Challenge
University of Ulster, Magee, UK, December 16, 2011

L_{37} V. Beiu: Reliability Prospects for Ultra Low Power Hybrid NEMS-CMOS
UC Berkeley, Berkeley, CA, November 14, 2011

L_{36} V. Beiu: On Biologically Inspired Processing = Communication + Computation
University of Ulster, Magee, UK, November 19, 2010

$L_{34\text{-}35}$ V. Beiu: Brain Inspired Nano Architectures — Electron Behaving Badly
– IEEE P/T Colloquium, Los Alamos National Laboratory, Los Alamos, NM, USA, April 15, 2008
– CIT Distinguished Lecture Series, College of IT, UAEU, Al Ain, UAE, March 13, 2008

L_{33} V. Beiu: On Brain Inspired Low-Power Redundant Designs for Silicon Nano-electronics and Beyond
Khalifa University of Science, Technology and Research (KUSTAR), Sharjah, UAE, March 3, 2008

L_{32} V. Beiu: Fault Tolerant Brain Inspired Nano Architectures
CIT Distinguished Lecture Series, College of IT, UAEU, Al Ain, UAE, April 2006

L_{31} V. Beiu: On Brain Inspired Nano Architectures — There Are Plenty of Opportunities at the Top
University of Ulster, Londonderry, UK, November 25, 2005

L_{30} V. Beiu: Great Challenges of Nanoelectronics — There Are Plenty of Challenges at the Bottom
University of Ulster, Londonderry, UK, November 23, 2005

L_{29} V. Beiu: Achieving High-Speeds at Ultra Low-Power – Femto Joule Switching Nano Architectures
Heinz Nixdorf Institute/University of Paderborn, Paderborn, Germany, August 16, 2004

L_{28} V. Beiu: Highly Reliable Designs for Scaled CMOS and Other Nanodevices (SETs, RTDs, Molecular)
Heinz Nixdorf Institute/University of Paderborn, Paderborn, Germany, August 13, 2004

L_{27} V. Beiu: Review of Nanoelectronic Challenges and Some Plausible Solutions
University "Politehnica" of Bucharest, Bucharest, Romania, August 9, 2004

L_{26} V. Beiu: On Novel (neural-inspired) Nano Architectures
Washington State University, Pullman, WA, USA, November 7, 2003

L_{24-25} V. Beiu: Threshold Gates From TTL to Quantum Computing (Part I and Part II)
– Heinz Nixdorf Institute/University of Paderborn, Paderborn, Germany, July 2, 2003
– University of Paderborn, Paderborn, Germany, July 3, 2003

L_{23} V. Beiu: Advanced Real-Time-Radiography Graphical Object Selection (ARGOS)
Washington State University, Pullman, WA, WA, USA, November 6, 2002

L_{22} V. Beiu: On VLSI Neural Computations
Washington State University, Pullman, WA, USA, October 22, 2001

L_{21} V. Beiu: FastLogic and Its Applications
Berkeley Wireless Research Center (BWRC), Berkeley, CA, USA, November 13, 2001

L_{20} V. Beiu: Neural Gates – Noise Robust but Fan-in Limited
University "Politehnica" of Bucharest, Bucharest, Romania, June 4, 2001

L_{19} V. Beiu: Neural Inspired Parallel Computations Require Analog Processors
Centre National de la Recherche Scientifique (CNRS), Paris, France, September 18, 1998

L_{18} V. Beiu: Introduction to Hardware Implementations of Neural Networks (series of 3 lectures)
State University of Sao Paulo, Sao Paulo, Brazil, December 8-10, 1997

L_{15-17} V. Beiu: Kolmogorov's Superpositions, Computer Architectures, and VLSI CAD
– Dalle Molle Institute for Perceptual AI (IDIAP), Martigny, Switzerland, October 2, 1997
– Paderborn University, Paderborn, Germany, September 30, 1997
– Heinz Nixdorf Institute (HNI), Paderborn, Germany, September 29, 1997

L_{14} V. Beiu: 2D Neural Network Hardware vs 3D Biological Ones
University Paris XII, Paris, France, September 22, 1997

L_{13} V. Beiu: Optimal Synthesis of Neural Circuits Using a Construction for Kolmogorov's Superpositions
King's College London, London, UK, June 13, 1997

L_{12} V. Beiu: On Constructing Size- and VLSI-Optimal Neural Networks
Royal Holloway University, Egham, UK, June 11, 1997

L_{11} V. Beiu: On Entropy Bounds with Application to Designing Constructive Neural Learning Algorithms
Oxford University, Oxford, UK, June 9, 1997

L_{10} V. Beiu: Entropy and Efficient Neural Learning
University "Politehnica" of Bucharest, Bucharest, Romania, June 2, 1997

L_{9} V. Beiu: Hardware Implementation of Neural Networks – A Comprehensive Review
Los Alamos National Laboratory, Los Alamos, NM, USA, February 7, 1997

L_{8} V. Beiu: Hardware Implementations of Neural Networks – Where Are We, and Where Are We Going?
Series of lectures, University of Pernambuco, Recife, Brazil, November 15-20, 1996

L_{6-7} V. Beiu: On the Complexity of Area- and Time-Efficient VLSI Implementations of Neural Networks
– Royal Holloway University, Egham, UK, June 12, 1996
– "Transilvania" University of Braşov, Braşov, Romania, December 19, 1995

L_5 V. Beiu: VLSI-Efficient (Neural) Learning
University "Politehnica" of Bucharest, Bucharest, Romania, May 22, 1995

L_4 V. Beiu: Hardware Implementations of Neural Networks
Center for Neural Networks, King's College London, London, UK, February 9, 1995

L_3 V. Beiu: On Efficient Neural VLSI Implementations
University "Politehnica" of Timişoara, Timişoara, Romania, November 21, 1994

L_2 V. Beiu, and A. Florea: CAD Tools for PCs (series of lectures)
AVERSA SA, Bucharest, Romania, May-June, 1991

L_1 V. Beiu, and A. Florea: IBM PC Training (series of lectures)
Ministry of National Defense, Bucharest, Romania, March - April, 1991

INVITED PRESENTATIONS TO CONFERENCES/UNIVERSITIES/NATIONAL LABS/ETC. 73

P_{73} R.-M. Beiu, V. Dragoi, and V. Beiu
3D Hammocks and 2.5D Consecutive – Biology Fine Balancing
International Workshop on Soft Computing Applications SOFA2020
Virtual conference, November 27-29, 2020

P_{72} M. Tache, V. Dragoi, and V. Beiu
When Reliability Gets Nasty – The Devil Is in the Details
International Workshop on Soft Computing Applications SOFA2020
Virtual conference, November 27-29, 2020

P_{71} R.-M. Beiu, S. Hoara, and V. Beiu
And Now This: Hammocks for Quantum and Photonics
International Workshop on Soft Computing Applications SOFA2020
Virtual conference, November 27-29, 2020

P_{70} R.-M. Beiu, M. M. Balas, V. E. Balas, and V. Beiu
Seeing Is Believing
International Conference on Optics, Photonics and Laser Technologies OPTICS & LASER-2019
San Francisco, CA,USA, June 3-5, 2019

P_{69} F.-D. Munteanu, A. Cavaco-Paulo, M. A. Mernea, and V. Beiu
Studies of Solvated Ions in Confined Spaces
New Trends on Sensing-Monitoring-Telediagnosis for Life Sciences NT-SMT-LS'17
Bucharest, Romania, September 7-9, 2017

P_{68} V. Beiu: Photonic Techniques for Brain Imaging
SPIE International Conference for Lasers in Medicine
Timisoara, Romania, July 13-15, 2017

P_{67} V. Beiu, and M. Tache:
On Threshold Voltage Variation-Tolerant Designs
International Symposium on Research and Education in Innovation Era ISREIE'16
Arad, Romania, December 8-10, 2016

– V. Beiu: Elucidating the Low Power of the Brain – Why Ions Really Matter [Canceled]
CMOS Emerging Technologies Research CMOSETR'16
Montreal, Canada, May 25-27, 2016

P_{66} V. Beiu, and L. Dauş
Deciphering the Reliability Scheme of the Neurons – One Ion Channel at a Time
International Conference on Bio-inspired Information & Communication Technology BICT'14
Boston, MA, USA, December 1-3, 2014

P_{65} V. Beiu: Bio-Inspired Designing with Arrays – When Distributions are Non-Gaussian
CMOS Emerging Technologies Research CMOSETR'14, Grenoble, France, July 6-8, 2014
http://books.google.ca/books?id=OL3aAwAAQBAJ&pg=PA102

P_{64} V. Beiu: What's All the Fuss About the Brain? A Few Large Brain Research Projects
Cognitive Society Day, UAEU, Al Ain, UAE, May 20, 2014

P_{63} V. Beiu, A. Beg, and W. Ibrahim
Atto-Joule Gates for the Whole Voltage Range
IEEE International Conference on Nanotechnology IEEE-NANO'11
Portland, OR, USA, August 15-19, 2011

P_{62} V. Beiu: Quo Vadis Nano Architectures [Why U×I Can Be Zero]
The 3rd UAEU Physics Symposium, Al Ain, Abu Dhabi, UAE, May 5, 2011

P_{61} V. Beiu: Ultra Low Power Processing Should Be … Biologically Inspired
Masdar Institute of Science and Technology. Abu Dhabi, UAE, January 10, 2011

P_{60} P.M. Kelly, F. Tuffy, V. Beiu, and L.J. McDaid
Reduced Interconnects in Neural Networks
Using a Time Multiplexed Architecture based on Quantum Devices
International ICST Conference on Nano-Networks Nano-Net'09
Luzern, Switzerland, October 18-20, 2009

P_{59} W. Ibrahim, and V. Beiu
A Bayesian-based EDA Tool for Nano-Circuits Reliability Calculations
International ICST Conference on Nano-Networks Nano-Net'09
Luzern, Switzerland, October 18-20, 2009

P_{58} V. Beiu, B.A.M. Madappuram, P.M. Kelly, and L.J. McDaid
On Two-layer Hierarchical Networks: How Does the Brain Do This?
International ICST Conference on Nano-Networks Nano-Net'09
Luzern, Switzerland, October 18-20, 2009

P_{57} V. Beiu, W. Ibrahim, and R.Z. Makki
On Wires Holding a Handful of Electrons
International ICST Conference on Nano-Networks Nano-Net'09
Luzern, Switzerland, October 18-20, 2009

P_{56} V. Beiu, H. Amer, and M. McGinnity
On Global Communications for Nano-Architectures: Brain versus Rent's Rule
IEEE International Conference on Design of Circuits and Integrated Systems DCIS'07
Seville, Spain, November 21-23, 2007

P_{55} R.M. Beiu, C.D. Stanescu, and V. Beiu
Nanostructured Fiber Optics as Highly Sensitive Mechanical Sensors
International Trends in NanoTechnology TNT'07, San Sebastian, Spain, September 3-7, 2007

P_{54} V. Beiu: On Brain-inspired Nano-architectures – An Inescapable Device-level Convergence?
Center on Functional Engineered Nano Architectonics (FENA)
University of California at Los Angeles (UCLA), Los Angeles, CA, USA, April 27, 2007

P_{53} V. Beiu: A Brain-inspired Perspective on Nano-Communications
NanoMaterials'07, San Diego, CA, USA, April 23-25, 2007

P_{52} V. Beiu: The Quest for Redundant Computations – When Neural-inspired Will Outperform Classical Architectures
NSF Workshop on Architectures for Silicon Nanoelectronics and Beyond
Portland State University, Portland, OR, USA, September 13-14, 2005

P_{51} V. Beiu: From Perceptrons to Neural Inspired Circuits and Nano Architectures
Advanced Research and Development Agency (ARDA)
Oak Ridge National Lab, Knoxville, TN, USA, April 11-12, 2005

$P_{47\text{-}50}$ V. Beiu: From Neural Inspired Gates and Circuits to Nano Architectures
– Centre National de la Recherche Scientifique (CNRS), Paris, France, July 2005
– University of Rochester, Rochester, NY, USA, March 15, 2005
– Rochester Institute of Technology, Rochester, NY, USA, March 14, 2005
– Technical University of Graz, Graz, Austria, March 3, 2005

P_{46} V. Beiu: A Novel Highly Reliable Low-Power Nano Architecture – When von Neumann Augments Kolmogorov
IEEE International Conference on Application-specific Systems, Architectures and Processors ASAP'04
Galveston, TX, USA, September 27-29, 2004

P_{45} J. Nyathi, V. Beiu, and S. Aunet
Femto Joule Switching — Review of Low Energy Design Styles for the Nano Era
International Symposium on Nano and Giga Challenges in Nanoelectronics NGCM'04
Krakow, Poland, September 13-17, 2004

P_{44} V. Beiu, J.M. Quintana, M.J. Avedillo, and M.H. Sulieman
Threshold Logic – From TTL to Nanoelectronics
IEEE International Midwest Symposium on Circuit and Systems MWSCAS'03
Cairo, Egypt, December 27-30, 2003

P_{43} M.H. Sulieman, and V. Beiu
Review of Recent Full Adders Implemented in Single Electron Technology
IEEE International Midwest Symposium on Circuit and Systems MWSCAS'03
Cairo, Egypt, December 27-30, 2003

P_{42} S. Roy, V. Beiu, and M.H. Sulieman
Reliability Analysis of Some Nano Architectures
Neural Information Processing System NIPS'03, Whistler, Canada, December 12-13, 2003

P_{41} J.M. Quintana, M.J. Avedillo, and V. Beiu
Beyond Threshold Logic Gates
Neural Information Processing System NIPS'03, Whistler, Canada, December 12-13, 2003

P_{40} M.H. Sulieman, and V. Beiu
Characterization of Optimal Practical Adders for SET
Neural Information Processing System NIPS'03, Whistler, Canada, December 12-13, 2003

P_{39} J. Nyathi, V. Beiu, S. Tatapudi, and D.J. Betowski
Low Power Charge Recycling Asynchronous Designs
Neural Information Processing System NIPS'03, Whistler, Canada, December 12-13, 2003

P_{38} V. Beiu: Threshold Logic – From the Early Days into the Nanoera
Neural Information Processing System NIPS'03, Whistler, Canada, December 12-13, 2003

P_{37} V. Beiu: Review of Silicon Nanoelectronics and Beyond
Neural Information Processing System NIPS'03, Whistler, Canada, December 12-13, 2003

P_{36} V. Beiu: Designing with Perceptrons
University of Paderborn, Paderborn, Germany, November 10, 2003

P_{35} V. Beiu: Advanced Real-Time-Radiography Graphical Object Selection (ARGOS)
Washington State University, Pullman, WA, USA, October 11, 2002

P_{34} V. Beiu, H.E. Makaruk, D. Morgan, and L. Popa-Simil
ARGOS – Advanced RTR Graphical Object Selection
Los Alamos National Laboratory, Los Alamos, NM, USA, July 24, 2002

$P_{23\text{-}33}$ V. Beiu: On VLSI-Optimal Neural Computations
– University of Hawaii, Honolulu, HI, USA, April 12, 2001
– Rutgers University, Rutgers, NJ, USA, April 9, 2001
– Boston University, Boston, MA, USA, April 6, 2001
– University of Texas at Arlington, Arlington, TX, USA, April 2, 2001
– Rochester Institute of Technology, Rochester, NY, USA, March 22, 2001
– California Polytechnic State University, San Luis Obispo, CA, USA, March 19, 2001
– University of Wisconsin Milwaukee, Milwaukee, WI, USA, March 9, 2001
– University of California at Riverside, Riverside, CA, USA, March 2, 2001
– Illinois Institute of Technology, Chicago, IL, USA, February 23, 2001
– Washington State University, Pullman, WA, USA, February 9, 2001
– Metroplex Institute for Neural Dynamics (MIND), Dallas, TX, USA, November 4, 2000

P_{22} V. Beiu: On Biological and Hardware Neural Networks
International Joint Meeting AMS-SMM, Denton, TX, USA, May 19-22, 1999

P_{21} V. Beiu: A Novel Microsatellite Control System
International ICSC Symposium on Engineering of Intelligent Systems EIS'98
Tenerife, Canary Islands, Spain, February 9-13, 1998

P_{20} V. Beiu: A Space-Based Radio Frequency Transient Event Classifier
International ICSC Symposium on Engineering of Intelligent Systems EIS'98
Tenerife, Canary Islands, Spain, February 9-13, 1998

P_{19} V. Beiu: On VLSI-Optimal Constructive Algorithms for Classification Problems
International ICSC Symposium on Engineering of Intelligent Systems EIS'98
Tenerife, Canary Islands, Spain, February 9-13, 1998

P_{18} V. Beiu: Time-Space Trade-Offs in Parallel and Neural Computing
International ICSC Symposium on Engineering of Intelligent Systems EIS'98
Tenerife, Canary Islands, Spain, February 9-13, 1998

P_{17} V. Beiu, and H.E. Makaruk: Deeper and Sparser Nets Are Optimal
International ICSC Symposium on Engineering of Intelligent Systems EIS'98
Tenerife, Canary Islands, Spain, February 9-13, 1998

P_{16} R. Andonie, and V. Beiu
Optimization of Circuits Using Neural Networks
Workshop on Shaping the Hardware Solutions for the Third Millennium ANITA'96
Uppsala, Sweden, December 9-10, 1996

P_{15} V. Beiu: VLSI Complexity of Threshold Gate COMPARISON
International Symposium on Neuro-Fuzzy Systems AT'96
Lausanne, Switzerland, August 29-31, 1996

P_{14} V. Beiu, and J.G. Taylor
Area-Efficient Constructive Learning Algorithm
International Conference on Control System and Computer Science CSCS-10
Bucharest, Romania, May 25, 1995

P_{13} V. Beiu: Optimal VLSI Implementations of Neural Networks – VLSI-Friendly Learning Algorithms
Applied Decision Technologies Conference ADT'95, London, UK, April 3-5, 1995

P_{12} V. Beiu, J.A. Peperstraete, J. Vandewalle, and R. Lauwereins
Addition Using Constrained Threshold Gates
International Conference on Technical Informatics ConTI'94
Timişoara, Romania, November 16-19, 1994

P_{11} V. Beiu, J.A. Peperstraete, J. Vandewalle, and R. Lauwereins
Digital Implementations of Neural Networks Using Threshold Gates
International Conference Romania and Romanians in Contemporary Science RRCS'94
Sinaia, Romania, May 24-27, 1994

P_{10} V. Beiu, J.A. Peperstraete, J. Vandewalle, and R. Lauwereins
VLSI Complexity Reduction by Piece-Wise Approximation of the Sigmoid Function
European Symposium on Artificial Neural Networks ESANN'94, Brussels, Belgium, April 20-22, 1994

P_{9} V. Beiu, J.A. Peperstraete, J. Vandewalle, and R. Lauwereins
Learning from Examples and VLSI Implementation of Neural Networks
European Meeting on Cybernetics and System Research EMCSR'94, Vienna, Austria, April 5-8, 1994

P_{8} V. Beiu: J.A. Peperstraete, J. Vandewalle, and R. Lauwereins
Close Approximations of Sigmoid Functions by Sum of Steps
Romanian Symposium on Computer Science ROSYCS'93, Iaşi, Romania, November 12-13, 1993

P_{7} V. Beiu, J.A. Peperstraete, J. Vandewalle, and R. Lauwereins
Overview of Some Efficient Threshold Gate Decomposition Algorithms
International Conference on Control System and Computer Science CSCS-9
Bucharest, Romania, May 25-28, 1993

P_{6} V. Beiu, J.A. Peperstraete, and R. Lauwereins
Enhanced Threshold Gate Fan-in Reduction Algorithm
Interdisciplinary Centrum for Neural Networks ICNN'92, Leuven, Belgium, November 19, 1992

P_{5} V. Beiu: D. C. Ioan, M. Dumbrava, and O. Robciuc
Physical Fields Determination Using Continuous Boltzmann Machines
Symposium on Parallel Computing SPC'91, Bucharest, Romania, December 10-11, 1991

P_{4} V. Beiu: Neural Network Priority Queue
International Workshop on Parallel Processing by Cellular Automata PARCELLA'90
Berlin, Germany, September 19-21, 1990

P_{3} V. Beiu: From Systolic Arrays to Neural Networks
International Symposium on Informatics INFO-IASI'89, Iaşi, Romania, October 19-21, 1989

P_{2} V. Beiu: Memory Structure with Simultaneous Read and Write Capabilities
Conference of the Military Academy of Sciences, Bucharest, Romania, November 17-19, 1982

P_{1} V. Beiu: Reliability Enhanced Memory Architecture with Gracefully Degrading Performances
Jubilee Session: Ten Years from the Foundation of the Special High-School for Informatics
Bucharest, Romania, May 1981

INVITED PRESENTATIONS TO INDUSTRY 46

I_{46} T.-J. King Liu, V. Beiu, M. Tache, W. Ibrahim, and A. Beg
Ultra Low Power Hybrid NEMS-CMOS
SRC GRC SLD Design Review, Intel, Hillsboro, OR, USA, May 7, 2015

I_{45} V. Beiu, G. Fettweis, M. Alioto, F. Kharbash, and W. Ibrahim
Technical Mapping onto FinFETs
SRC GRC ACE4S Annual Review, Abu Dhabi, UAE, April 23, 2014

I_{44} V. Beiu, T.-J. King Liu, G. Fettweis, M. Alioto, F. Kharbash, W. Ibrahim, A. Beg, and M. Tache
Ultra-low Power: Unconventional Sizing, NEMS, and FinFETs
SRC GRC Design Review, Bangalore, India, January 10, 2014

I_{43} V. Beiu, T.-J. King Liu, W. Ibrahim, A. Beg, and M. Tache
Ultra Low Power Hybrid NEMS-CMOS
SRC GRC ICSS Circuits & Texas Analog Center of Excellence (TxACE), Dallas, TX, USA, October 25, 2013

I_{42} V. Beiu, M. Alioto, A. Beg, W. Ibrahim, and F. Kharbash
Unconventional Sizing for Enabling Low Power Digital Design
SRC GRC CADTS LPD, Georgia Tech, Atlanta, GA, USA, October 2, 2013

I_{41} V. Beiu, G. Fettweis, M. Alioto, F. Kharbash, and W. Ibrahim
Ultra-low Power Digital FinFET Amplifiers
SRC/ATIC ACE^{4}S Kickoff Meeting, Abu Dhabi, UAE, September 23, 2013

I_{40} V. Beiu, T.-J. King Liu, W. Ibrahim, A. Beg, and M. Tache
Ultra Low Power Hybrid NEMS-CMOS
SRC GRC ICSS Circuits & Texas Analog Center of Excellence (TxACE), Dallas, TX, USA, October 25, 2012

I_{39} V. Beiu, M. Alioto, A. Beg, W. Ibrahim, and F. Kharbash
Unconventional Sizing for Enabling Low Power Digital Design
SRC-MEES Kickoff Meeting, Abu Dhabi, UAE, October 21, 2012

I_{38} V. Beiu, T.-J. King Liu, W. Ibrahim, A. Beg, and M. Tache
Ultra Low Power Hybrid NEMS-CMOS
SRC-MEES, Abu Dhabi, UAE, October 21, 2012

I_{37} V. Beiu, W. Ibrahim, A. Beg, and F. Kharbash
Ultra Low Power Hybrid NEMS-CMOS
IBM-CIT, UAEU, Al Ain, UAE, October 4, 2012

I_{36} V. Beiu: On the Reliability Accuracy Challenge – Bio-inspired Arrays to the Rescue
Intel, Portland, OR, USA, March 29, 2012

I_{35} V. Beiu, T.-J. King Liu, W. Ibrahim, A. Beg, and M. Tache
Ultra Low Power Hybrid NEMS-CMOS
SRC-MEES Kickoff Meeting for New ATIC Projects (web-conference), NC, USA, January 17, 2012

I_{34} V. Beiu: On the Reliability of Self-assembled 2D and 3D Arrays
Intel, Santa Clara, CA, USA, November 17, 2011

I_{33} V. Beiu, T.-J. King Liu, W. Ibrahim, and A. Beg
Ultra Low Power Hybrid NEMS-CMOS
SRC/ATIC University Research Kickoff Meeting, Abu Dhabi, UAE, October 26, 2011

I_{32} V. Beiu: Brain-inspired Hybrid Topologies for Nano-architectures
SRC GRC ICSS Circuits & Texas Analog Center of Excellence (TxACE), Dallas, TX, USA, October 24-28, 2011

I_{31} V. Beiu: From Reliable Neurons to Regular Nano-Fabrics — Six Month Later
Intel, Santa Clara, CA, USA, February 25, 2011

I_{30} V. Beiu: From Reliable Neurons to Regular Nano-Fabrics
Intel, Santa Clara, CA, USA, September 9, 2010

I_{29} V. Beiu: Reliable Ultra Low-Power Information Processing
ATIC (later Mubadala Technology) Abu Dhabi, UAE, March 2010

I_{28} V. Beiu: When Electrons Start Showing Their True Colors — Quo Vadis Nanoarchitectures?
IBM Thomas J. Watson Research Center, Yorktown Heights, NY, USA, June 2008

I_{27} V. Beiu: Brain Inspired Nano Architectures — Electrons Behaving Badly
IBM Research, Böblingen, Germany, May 20, 2008

I_{26} V. Beiu: Interconnect Tyranny – Brain's versus Rent's Rule
HP Labs, Santa Clara, CA, USA, April 26, 2007

I_{25} V. Beiu: On 3D Nano-Designs – In the Yield-Energy-Delay Realm
International Technology Roadmap for Semiconductors (ITRS), SRC, Austin, TX, USA, March 22, 2007

$I_{20\text{-}24}$ V. Beiu: On Neural-Inspired Nano Architectures (CNINA)
– Synplicity, September 26, 2003
– AMD, September 26, 2003
– Agilent Labs, September 25, 2003
– Infineon, September 25, 2003
– SUN Microsystems, September 25, 2003

I_{19} V. Beiu: Direct Digital Frequency Synthesizers: A Survey
Boeing, Seattle, WA, USA, February 5, 2003

$I_{16\text{-}18}$ G. LaRue, V. Beiu, and F. Shi
Direct Digital Frequency Synthesizer for Reconfigurable Communication Systems
– Air Force Research Laboratory (AFRL) and the Centre for Design of Analog-Digital ICs (CDADIC) Welches, OR, USA, July 9-11, 2003
– Air Force Research Laboratory (AFRL) and the Centre for Design of Analog-Digital ICs (CDADIC) Seattle, WA, USA, February 7, 2003
– Air Force Research Laboratory (AFRL) and the Centre for Design of Analog-Digital ICs (CDADIC) Stevenson, Washington, USA), July 10, 2002

$I_{1\text{-}15}$ V. Beiu: ... (under NDAs)
– Q'Bit Systems SRL, Bucharest, Romania, October 24, 2000
– ESSEX Com SRL, Bucharest, Romania, October 23, 2000
– Utimaco, Brussels, Belgium, May 26, 2000
– ST Microelectronics, San Diego, CA, USA, September 29, 1999
– ST Microelectronics, Carrollton, TX, USA, August 20, 1999
– Texas Instruments, Dallas, TX, USA, August 16, 1999
– Sipex, Milpitas, CA, USA, August 13, 1999
– ST Microelectronics, San Jose, CA, USA, August 13, 1999
– ST Microelectronics, San Jose, CA, USA, April 16, 1999
– National Semiconductors, Santa Clara, CA, USA, April 16, 1999
– Alcatel, Brussels, Belgium, April 14, 1999
– Texas Instruments, Dallas, TX, USA, April 1, 1999
– Texas Instruments, Houston, TX, USA, March 25, 1999
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