



Ljupco Kocarev

Address	Macedonian Academy of Sciences and Arts, Bul. Krste Misirkov 2, PO Box 428, 1000 Skopje, Macedonia; e-mail: lkocarev@ucsd.edu
Honors	• 2012 – present: Vice President, Macedonian Academy of Sciences and Arts, Macedonia • 2008 – 2011: Scientific Secretary, Macedonian Academy of Sciences and Arts, Macedonia • 2007 Member of the Macedonian Academy of Sciences and Arts • 2006 Fellow of IEEE
Work experience	• 2007 – present: Full Professor of Computer Science and Engineering, University “Sv. Kiril i Metodij” Skopje Macedonia • 2009 – present: Research Scientist (at full professor rank), BioCircuits Institute, University of California San Diego, USA • 2000 – 2009: Research Scientist (at full professor rank), Institute for Nonlinear Studies, University of California San Diego, USA • 1995 – 2000: Associate Professor of Physics, University “Sv. Kiril i Metodij” Skopje, Macedonia • 1990 – 1995: Assistant Professor of Physics, University “Sv. Kiril i Metodij” Skopje, Macedonia • 1986 – 1990: Teaching Assistant, University “Sv. Kiril i Metodij” Skopje Macedonia (Macedonia) • 1981 – 1985: Software engineer (Macedonia)
Education	• 1989 PhD in Physics (Nonlinear Science), Skopje, Macedonia • 1988 MSc in Electrical Engineering, Belgrade, Serbia • 1980 BS in Electrical Engineering (5 year degree), University “Sv. Kiril i Metodij”, Skopje, Macedonia
Research interests	Complex Systems and Networks, Nonlinear Circuits and Systems; Dynamical Systems; Communication Networks; Cryptography; Coding Theory; Computational Biology
Visiting positions	• 1992 – 1993: University of California Berkeley, USA • 1998 – 1999: University of California San Diego, USA • Several one-month visits: University of Gottingen (Germany), Collegium Budapest (Hungary), Politecnico di Torino (Italy), University of Bologna (Italy), University of Tokyo (Japan)

Publications

- Over 100 journal publications in 30 different journals
- Over 100 conference proceedings publications
- Over 20 book chapters
- Editor of 5 books

Citations

- Science Citation Index (Web of Science): over 5500 citations; h index 32
- Google Scholar: over 8500 citations; h index 39

Distributions of papers by journals

- IEEE Transaction on Circuits and Systems – 20 papers
- International Journal of Bifurcation and Chaos – 18 papers
- Physics Letters A – 16 papers
- Physical Review E – 15 papers
- Physical Review Letters – 7 papers
- Chaos, Solitons, and Fractals – 5 papers
- Chaos: An International Journal of Nonlinear Science – 4 papers
- Comm. in Nonlinear Science and Numerical Simulation – 3 papers
- Journal of Circuits, Systems, and Computers – 3 papers
- Physica A: Statistical Mechanics and its Applications – 3 papers
- Physica D: Nonlinear phenomena – 3 papers
- 21 different journals with a single paper published:
 - o Chemical Physics;
 - o Circuits; Systems and Signal Processing;
 - o Cognitive processing (Springer);
 - o ComPlexUs (Karger AG, Basel);
 - o Electronics Letters;
 - o Geophysical Research Letters;
 - o International Journal of Circuit Theory and Application;
 - o International Journal of Network Security;
 - o IEEE Circuits and Systems Magazine;
 - o IEEE Communication Letters;
 - o IEEE Network;
 - o IEEE Transaction on Information Theory;
 - o IEICE Transactions on Fundamentals and Electronics, Communications and Computer Science;
 - o Journal of Chemical Physics;
 - o Journal of Physics A: Mathematical and Gen Physics;
 - o Journal of the Franklin Institute;
 - o Nonlin. Processes Geophys;
 - o Philosophical Transactions of the Royal Society A;
 - o Physical Review B;
 - o Z. Angew. Math. Mech (ZAMM).

Distributions of journal papers by years

1986	1987	1988	1989	1990	1991	1992	1993	1994
1	2	1	0	1	0	3	7	4

1995	1996	1997	1998	1999	2000	2001	2002	2003
5	12	10	3	2	4	7	4	2

2004	2005	2006	2007	2008	2009	2010	2011	2012
4	7	7	5	5	5	6	6	4

Current projects (as PI or co-PI)

- Supermodeling by combining imperfect models, FP7 FET Open, (EC), 2010 – 2013
- Optimization and Performance Enhancement of Complex Networks using Sensors (ONR Global, USA), 2010 – 2013
- EURAXESS TOP II, coordinated actions FP7, 2011 – 2014
- WeB-InUnion, coordinated actions FP7, 2012 – 2014
- Annotated graphs in system biology (Macedonia), 2010 – 2012
- Diagnosing vulnerability, emergent phenomena, and volatility in manmade networks, (MANU, Macedonia), 2011 – 2014
- An Interactive Multi-Model for Consensus on Climate Change (Department of Energy, USA), 2010 – 2013
- Non-coherent Communication for Future Wireless Networks, DFG, Germany, 2011 – 2013

Past and present funding agencies

Macedonian Government; US Government: NSF, AFOSR (Air Force Office of Scientific Research), DoE (Department of Energy) and ONR (Office of Naval Research); Industry: STMicroelectronics; NATO; EC (TEMPUS, FP6 and FP7); and agencies from Spain, Italy, Germany (DAAD, DFG), Hong Kong, and Hungary.

Current administrative and science policy activities

- Member of the National Agency for Accreditation and Evaluation
- Member of the National Scientific Council
- Member of the National European Integration Council
- Member of the University Council

Memberships to Editorials Boards of International Journals

- Editorial Board
 - ✓ IEEE Transactions on Circuits and Systems, 2002 – 2004; 2006 – 2008
 - ✓ Journal of the Franklin Institute, 2007 – 2010
- Guest Editor
 - ✓ IEEE Transactions on Circuits and Systems, 2001, Special Issue on Applications of Chaos in Modern Communication Systems
 - ✓ IEICE Transactions on Fundamentals and Electronics, Communications and Computer Science, 2004, 2005, 2006, 2007, 2008

Books

- V. In, L. Kocarev et al (Editors), "Proceeding of 7th Experimental Chaos Conference", AIP, New York, 2004
- L. Kocarev and G. Vattay (Editors), "Complex Dynamics in Communication Networks", Springer, New York, 2005
- L. Kocarev, Z. Galias, and S. Lian (Editors), "Intelligent Computing Based on Chaos", Series: Studies in Computational Intelligence, Vol. 184, Springer, 2009
- L. Kocarev and S. Lian (Editors), "Chaos-based Cryptography: Theory, Algorithms and Applications" (Studies in Computational Intelligence), Springer, 2011

- L. Kocarev (Editor) ICT Innovations 2011 (Advances in Intelligent and Soft Computing), Springer, 2012

Reviewer

- Referee for over 30 journals including Nature, Science, Physical Review Letters, and over 10 different IEEE Transactions.
- Referee for various agencies including Macedonian Ministry of Education and Science, Hong Kong Research Council, VINNOVA (Swedish Governmental Agency for Innovation Systems), NSF (National Science Foundation, USA), ONR (Office of Naval Research, USA), and EC (FP7 programme).

Granted patents

- L. Kocarev, T. Stojanovski, G. Rizzotto, F. Italia, D. Porto, Method for generating a random number sequence and a relative random bit generator, European Patent EP1320026; Publication Date: 18/06/2003
- L. Kocarev, G. Jakimoski, G. Rizzotto, P. Amato, Chaos-based block encryption, European Patent EP1326363; Publication Date: 09/07/2003; United States Patent 7106864; Publication Date: 12/09/2006
- L. Kocarev, Z. Tasev, P. Amato, G. Rizzotto, Encryption process employing chaotic maps and digital signature process, European Patent EP1467512; Publication Date: 13/10/2004; United States Patent 6892940; Publication Date: 17/05/2005
- L. Kocarev, P. Amato, G. Rizzotto, Method and apparatus of generating a chaos-based pseudo-random sequence, European Patent EP1420542; Publication Date: 19/05/2004
- L. Kocarev, P. Amato, G. Rizzotto, Encryption process employing modified chaotic maps and relative digital signature process, European Patent EP1467514; Publication Date: 14/06/2006
- L. Kocarev, S. Markovski, D. Gligoroski, Cryptographic primitives, error coding, and pseudo-random number improvement methods using quasi-groups, European Patent EP1800432; Publication Date: 27/06/2007

Top ten cited papers:

1. L. Kocarev and U. Parlitz, "Generalized synchronization, predictability, and equivalence of unidirectionally coupled dynamical systems", Physical Review Letters, Volume: 76, Pages: 1816 –1819, 1996
Times Cited: 632 (from Web of Science), 826 (from Google Scholar)
2. L. Kocarev and U. Parlitz, "General approach for chaotic synchronization with applications to communication", Physical Review Letters, Volume: 74, Pages: 5028 – 5031, 1995
Times Cited: 626 (from Web of Science), 941 (from Google Scholar)
3. L. Kocarev, K. S. Halle, K. Eckert, L. O. Chua, and U. Parlitz, "Experimental demonstration of secure communication via chaotic synchronization", International Journal of Bifurcation and Chaos, Vol. 2, pp. 709 – 713, 1992

- Times Cited: 481 (from Web of Science), 713 (from Google Scholar)
4. U. Parlitz, L. O. Chua, L. Kocarev, K. S. Halle, and A. Shang, "Transmission of digital signals by chaotic synchronization", *International Journal of Bifurcation and Chaos*, Vol. 2, pp. 973 – 977, 1992
Times Cited: 345 (from Web of Science), 547 (from Google Scholar)
 5. L. Kocarev, "Chaos-Based Cryptography: a Brief Overview", *IEEE Circuits and Systems Magazine*, Vol. 1(3), pp. 6 – 21, 2001
Times Cited: 177 (from Web of Science), 439 (from Google Scholar)
 6. U. Parlitz U, L. Junge, W. Lauterborn, and L. Kocarev, "Experimental observation of phase synchronization", *Physical Review E*, Volume: 54(2) Pages: 2115 – 2117, 1996
Times Cited: 177 (from Web of Science), 241 (from Google Scholar)
 7. R. Brown and L. Kocarev, "A unifying definition of synchronization for dynamical systems", *CHAOS*, Volume: 10(2) Pages: 344 – 349, 2000
Times Cited: 150 (from Web of Science), 204 (from Google Scholar)
 8. U. Parlitz, L. Junge and L. Kocarev, "Synchronization-based parameter estimation from time series", *Physical Review E*, Volume: 54(6) Pages: 6253 – 6259, 1996
Times Cited: 101 (from Web of Science), 140 (from Google Scholar)
 9. T. Stojanovski and L. Kocarev, "Chaos Based Random Number Generators Part I: Analysis", *IEEE Trans. on Circuits and Systems, Part I*, Vol. 48(3), pp. 281 – 288, 2001
Times Cited: 123 (from Web of Science), 231 (from Google Scholar)
 10. G. Jakimovski and L. Kocarev, "Chaos and Cryptography: Block Encryption Ciphers Based on Chaotic Maps" *IEEE Trans. on Circuits and Systems, Part I*, Vol. 48(2), Pages 163 – 169, 2001
Times Cited: 163 (from Web of Science), 330 (from Google Scholar)

Journal Publications:

1. V. Urumov and L. Kocarev, "The Phase Diagram of a Piecewise-Linear Oscillator", *ZAMM, Z. Angew. Math. Mech.*, Vol. 66, pp. 396 – 398, 1986
2. L. Kocarev, "The Basin Boundaries of One-Dimensional Maps", *Physics Letters A*, Vol. 121, pp. 274 – 278, 1987
3. L. Kocarev, "Quasifractal Metamorphosis of 1-D Maps," *Physics Letters A*, Vol. 125, pp. 389 – 342, 1987
4. L. Kocarev, "On a Class of Symmetrical Chaotic Attractors," *Physics Letters A*, Vol. 130, pp. 7 – 10, 1988
5. V. Urumov and L. Kocarev, "New Metric Elements of the Universal Fine Structure due to Multifurcation," *Physics Letters A*, Vol. 144, pp. 220 – 223, 1990
6. L. O. Chua, L. Kocarev, K. Eckart, and M. Itoh, "Experimental synchronization in Chua's circuit", *International Journal of Bifurcation and Chaos*, Vol. 2, pp. 705 – 708, 1992

7. L. Kocarev, K. S. Halle, K. Eckert, L. O. Chua, and U. Parlitz, "Experimental demonstration of secure communication via chaotic synchronization", *International Journal of Bifurcation and Chaos*, Vol. 2, pp. 709 – 713, 1992
8. U. Parlitz, L. O. Chua, L. Kocarev, K. S. Halle, and A. Shang, "Transmission of digital signals by chaotic synchronization", *International Journal of Bifurcation and Chaos*, Vol. 2, pp. 973 – 977, 1992
9. L. Kocarev and L. O. Chua, "On chaos in digital filters: case $b = -1$ ", *IEEE Transactions on Circuits and Systems II: Analog and Digital Signal Processing*, Vol. 40, pp. 404 – 407, 1993
10. L. Kocarev, L. Karadzinov and L. O. Chua, "N-dimensional canonical Chua's circuit", *Journal of Circuits, Systems and Computers*, Vol. 3, pp. 239 – 258, 1993
11. L. O. Chua, M. Itoh, L. Kocarev and K. Eckart, "Chaos synchronization in Chua's circuit", *Journal of Circuits, Systems and Computers*, Vol. 3, pp. 93 – 108, 1993
12. V. Belykh, N. N. Verichev, L. Kocarev and L. O. Chua, "On chaotic synchronization in a linear array of Chua's circuits", *Journal of Circuits, Systems and Computers*, Vol. 3, pp. 579 – 589, 1993
13. T. Kapitaniak, L. Kocarev and L. O. Chua, "Controlling chaos without feedback and control signals", *International Journal of Bifurcation and Chaos*, Vol. 3, pp. 459 – 568, 1993
14. L. Kocarev, A. Shang and L. O. Chua, "Transitions in dynamical regimes by driving: a unified method of control and synchronization of chaos", *International Journal of Bifurcation and Chaos*, Vol. 3, pp. 479 – 483, 1993
15. L. Kocarev, K. S. Halle, K. Eckart and L. O. Chua, "Experimental observation of anti-monotonicity in Chua's circuit", *International Journal of Bifurcation and Chaos*, Vol. 3, pp. 1051 – 1055, 1993
16. L. Kocarev, D. Dimovski, Z. Tasev and L. O. Chua, "Knotted periodic orbits in Chua's circuit", *International Journal of Bifurcation and Chaos*, Vol. 4, pp. 609 – 621, 1994
17. L. Kocarev and Z. Tasev, "Analytical Description of a Fractal Set Generated by the time-delayed Chua's Circuit", *International Journal of Bifurcation and Chaos*, Vol. 4, pp. 1639 – 1643, 1994
18. L. Kocarev, Z. Tasev, and D. Dimovski, "Topological Description of Chaotic Attractors with Spiral Structure", *Physics Letters A*, Vol. 190, pp. 399 – 402, 1994
19. L. Kocarev, "Chaotic Behavior in Digital Filters", *Journal of the Franklin Institute*, Vol. 331B, pp. 937 – 955, 1994
20. L. Kocarev and T. Kapitaniak, "On an equivalence of chaotic attractors", *J. Phys. A: Math. Gen.*, Vol. 28, pp. L249 – L254, 1995
21. L. Kocarev and U. Parlitz, "General Approach for Chaotic Synchronization with Application to Communication", *Physical Review Letters*, Vol. 74, pp. 5028 – 5031, 1995
22. L. Kocarev and T. Stojanovski, "On Chaotic Synchronization and Secure Communication", *IEICE Transactions on Fundamentals and Electronics, Communications and Computer Science*, Vol. J78-A, pp. 1142 – 1147, 1995

23. L. Kocarev and P. Janjic, "On Turing Instability in a System of Diffusely Coupled Oscillators", IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications, Vol. 42, pp. 779 – 784, 1995
24. J. Brindely, T. Kapitaniak, and L. Kocarev, "Controlling Chaos by Chaos in Geophysical Systems", Geophysical Research Letters, Vol. 22, pp. 1257 – 1260, 1995
25. L. Kocarev and U. Parlitz, "Generalized Synchronization, Predictability and Equivalence of Unidirectionally Coupled Systems", Physical Review Letters, Vol. 76, pp. 1816 – 1819, 1996
26. L. Kocarev, C. W. Wu, and L. O. Chua, "Complex behavior in digital filters: analytical results", IEEE Transactions on Circuits and Systems II: Analog and Digital Signal Processing, Vol. 43, pp. 234 – 246, 1996
27. U. Parlitz and L. Kocarev, "Multichannel Communication Using Auto - Synchronization", International Journal of Bifurcation and Chaos, Vol. 6, pp. 581 – 591, 1996
28. L. Kocarev and T. Stojanovski, "Linear Conjugacy of Vector Fields in Lur'e Form", IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications, Vol. 43, pp. 782 – 785, 1996
29. U. Parlitz, L. Kocarev, T. Stojanovski and H. Preckel, "Encoding Messages Using Chaotic Synchronization", Physical Review E, Vol. 53, pp. 4351 – 4361, 1996
30. L. Kocarev, U. Parlitz and T. Stojanovski, "An Application of Synchronized Dynamic Arrays", Physics Letters A, Vol. 217, pp. 280 – 284, 1996
31. U. Parlitz, L. Junge, W. Lauterborn and L. Kocarev, "Experimental observation of phase synchronization", Physical Review E, Vol. 54, pp. 2115 – 2117, 1996
32. T. Stojanovski, L. Kocarev and U. Parlitz, "Driving and synchronizing by chaotic impulses", Physical Review E, Vol. 54, pp. 2128 – 2131, 1996
33. L. Kocarev and U. Parlitz, "Synchronizing spatiotemporal chaos in coupled nonlinear oscillators", Physical Review Letters, Vol. 77, pp. 2206 – 2209, 1996
34. U. Parlitz, L. Junge and L. Kocarev, "Synchronization based parameter estimation from time series", Physical Review E, Vol. 54, pp. 6253 – 6529, 1996
35. T. Stojanovski, L. Kocarev and U. Parlitz, "A simple method to reveal the parameters of the Lorenz system", International Journal of Bifurcation and Chaos, Vol. 6, pp. 2645 – 2652, 1996
36. D. Gligorovski, D. Dimovski, L. Kocarev, V. Urumov and L. O. Chua, "A method for encoding messages by time targeting of the trajectories of chaotic systems", International Journal of Bifurcation and Chaos, Vol. 6, pp. 2119 – 2125, 1996
37. T. Stojanovski, L. Kocarev, U. Parlitz, and R. Harris, "Sporadic driving of dynamical systems", Physical Review E, Vol. 55, pp. 4035 – 4048, 1997
38. T. Stojanovski, L. Kocarev, and U. Parlitz, "Digital Coding via Chaotic Systems", IEEE Trans. on Circuits and Systems, Part I, Vol. 44, pp. 562 – 565, 1997

39. L. Kocarev, Z. Tasev and U. Parlitz, "Synchronizing spatiotemporal chaos of partial differential equations", *Physical Review Letters*, Vol. 79, pp. 51 – 54, 1997
40. L. Kocarev, U. Parlitz, T. Stojanovski, and P. Janjic, "Controlling Spatiotemporal Chaos in Coupled Nonlinear Oscillators", *Physical Review E*, Vol. 56, pp. 1238 – 1241, 1997
41. T. Stojanovski, U. Parlitz, L. Kocarev, and R. Harris, "Exploiting Delay Reconstruction for Chaos Synchronization", *Physics Letters A*, Vol. 233, pp. 139 – 152, 1997
42. T. Stojanovski, L. Kocarev, and R. Harris, "Applications of Symbolic Dynamics in Chaos Synchronization", *IEEE Trans. on Circuits and Systems, Part I*, Vol. 44, pp. 1014 – 1018, 1997
43. U. Parlitz, L. Kocarev, T. Stojanovski, and L. Junge, "Chaos Synchronization Using Sporadic Driving", *Physica D*, Vol. 109, pp. 139 – 152, 1997
44. L. Kocarev, Z. Tasev, T. Stojanovski and U. Parlitz, "Synchronizing spatiotemporal chaos", *CHAOS*, Vol. 7, pp. 635 – 643, 1997
45. U. Parlitz and L. Kocarev, "Using surrogate data analysis for unmasking chaotic communication systems", *International Journal of Bifurcation and Chaos*, Vol. 7, pp. 407 – 413, 1997
46. U. Parlitz, L. Junge, and L. Kocarev, "Subharmonic entrainment of unstable period orbits and generalized synchronization", *Physical Review Letters*, Vol. 79, pp. 3158 – 3161, 1997.
47. L. Kocarev, U. Parlitz, and B. Hu, "Lie derivatives and dynamical systems", *Chaos, Solitons and Fractals*, Vol. 9, pp. 1445 – 1455, 1998
48. L. Kocarev, P. Janjic, U. Parlitz, and T. Stojanovski, "Controlling spatiotemporal chaos in coupled oscillators by sporadic driving", *Chaos, Solitons, and Fractals*, Vol. 9, pp. 283 – 293, 1998
49. C. Mitrevski, L. Kocarev and N. Jonoska, "On a class of N - dimensional digital filters operating out of its stability region", *International Journal of Circuit Theory and Application*, Vol. 26, pp. 199 – 205, 1998
50. U. Parlitz, L. Junge and L. Kocarev, "Nonidentical synchronization of identical systems", *International Journal of Bifurcation and Chaos*, Vol. 9, pp. 2305 – 2309, 1999
51. L. Junge, U. Parlitz, Z. Tasev and L. Kocarev, "Synchronization and control of spatially extended systems using sensor coupling", *International Journal of Bifurcation and Chaos*, Vol. 9, pp. 2265 – 2270, 1999
52. L. Kocarev, U. Parlitz, and R. Brown, "Robust chaos synchronization", *Physical Review E*, Vol. 61, pp. 3716 – 3720, 2000
53. R. Brown and L. Kocarev, "A unifying definition of synchronization for dynamical systems", *CHAOS*, Vol. 10, pp. 344 – 349, 2000
54. Z. Tasev, L. Junge, U. Parlitz, and L. Kocarev "Synchronization of Kuramoto-Sivashinsky equations using local coupling", *International Journal of Bifurcation and Chaos*, Vol. 10(4), pp. 869 – 874, 2000

55. L. Kocarev and D. Walker, "Compactness of symbolic sequences from chaotic systems", Phys. Letters A, Vol. 274, pp. 200 – 205, 2000
56. G. Jakimovski and L. Kocarev, "Chaos and Cryptography: Block Encryption Ciphers Based on Chaotic Maps" IEEE Trans. on Circuits and Systems, Part I, Vol. 48(2), pp. 163 – 169, 2001
57. T. Stojanovski and L. Kocarev, "Chaos Based Random Number Generators Part I: Analysis", IEEE Trans. on Circuits and Systems, Part I, Vol. 48(3), pp. 281 – 288, 2001
58. T. Stojanovski, J. Pihl and L. Kocarev, "Chaos Based Random Number Generators Part II: Practical Realization", IEEE Trans. on Circuits and Systems, Part I, Vol. 48(3), pp. 382 – 385, 2001
59. C. Mitrovski and L. Kocarev, "Periodic Trajectories in Piecewise-Linear Maps, IEEE Trans. on Circuits and Systems, Part I, Vol. 48(10), pp. 1244 – 1246, 2001
60. L. Kocarev and G. Jakimovski, "Logistic map as a block encryption algorithm", Phys. Letters A, Vol. 289, pp. 199 – 206, 2001
61. L. Kocarev, "Chaos-Based Cryptography: a Brief Overview", IEEE Circuits and Systems Magazine, Vol. 1(3), pp. 6 – 21, 2001
62. G. Jakimoski and L. Kocarev, "Analysis of Some Recently Proposed Chaos-Based Encryption Algorithms," Phys. Letters A, Vol. 291, pp. 381 – 384, 2001
63. L. Kocarev and Z. Tasev, "Lyapunov Exponents, Noise-induced Synchronization and Parrondo's Paradox," Physical Review E, 65, pp. 046215 (4 pages), 2002
64. Z. Tasev and L. Kocarev, "Performance Evaluation of CPPM Modulation in Multi-path Environments," Chaos, Fractals and Solitons, Vol. 15, pp. 319 – 326, 2002
65. L. Illing, J. Broyer, L. Kocarev, U. Parlitz, and H. D. I. Abarbanel, "When are synchronization errors small?" Physical Review E, 66, pp. 036229, 2002
66. L. Kocarev, Z. Tasev, and A. Vardy, "Improving turbo codes by control of transient chaos in turbo-decoding algorithms," Electronics Letters, Vol. 38(20), pp. 1184 – 1186, 2002
67. G. Jakimoski and L. Kocarev, "Differential and Linear Probabilities of a Block Encryption Cipher," IEEE Trans. on Circuits and Systems, Part I, Vol. 50(1), pp. 121 – 123, 2003
68. L. Kocarev and G. Jakimoski, "Unpredictable Pseudo-Random Bits Generated by Chaotic Maps", IEEE Trans. on Circuits and Systems, Part I, Vol. 50(1), pp. 123 – 126, 2003
69. P. Popovski, L. Kocarev, and A. Risteski, "Design of Flexible-Length S-Random Interleaver for Turbo Codes," IEEE Communications Letters, Vol. 8, No. 7, pp. 461 – 463, 2004
70. L. Kocarev, M. Sterjev, A. Fekete and G. Vattay, "Public-key Encryption with Chaos," CHAOS, Vol. 14 (4), pp. 1078 – 1082, 2004.
71. L. Kocarev and Z. Tasev, "Chaos and control of transient chaos in turbo-decoding algorithms", International Journal of Bifurcation and Chaos, Vol. 14, No. 3, pp. 1147 – 1153, 2004

72. L. Kocarev and J. Szczepanski, "Finite-space Lyapunov exponents and pseudo-chaos," *Phys Rev Letters*, Vol. 93, pp. 234101(1 – 4), 2004
73. J. Szczepanski, J.M. Amigo, T. Michalek, and L. Kocarev, "Cryptographically secure substitutions based on the approximation of mixing maps," *IEEE Transactions on Circuits and Systems part I*, Vol. 52, No. 2, pp. 443 – 453, 2005
74. P. Bergamo, P. D'Arco, A. De Santis and L. Kocarev, "Security of Public Key Cryptosystems based on Chebyshev Polynomials," *IEEE Transactions on Circuits and Systems part I*, Vol. 52, No. 7, pp. 1382 – 1393, 2005
75. L. Kocarev and P. Amato, "Synchronization in Power-Law Networks," *CHAOS*, Vol. 15, pp. 024101(1 – 6), 2005
76. L. Kocarev, J. Makraduli, and P. Amato, "Public-Key Encryption Based on Chebyshev Polynomials," *Circuits, Systems and Signal Processing*, Vol. 24, No. 5, pp. 497 – 517, 2005
77. R. Femat, L. Kocarev, L. van Gerven, and M. E. Monsivais-Perez, "Towards Generalized Synchronization of Strictly Different Chaotic Systems," *Physics Letters A*, Vol. 342, pp. 247 – 255, 2005
78. J.M. Amigo, J. Szczepanski, and L. Kocarev, "Cryptographically Secure Substitutions Based on Chaotic Maps," *Physics Letters A*, Vol. 343, pp. 55 – 60, 2005
79. J.M. Amigo, M.B. Kennel and L. Kocarev, "The permutation entropy rate equals the Kolmogorov-Sinai entropy rate for mixing dynamical systems," *Physica D*, Vol. 210, pp. 77 – 95, 2005
80. J.M. Amigo, L. Kocarev, and J. Szczepanski, "Order patterns", *Physics Letters A*, Vol. 355, pp. 27 – 31, 2006
81. A. Fekete, G. Vattay, and L. Kocarev, "Distribution of edge load in scale-free trees" *Physical Review E*, Vol. 73, 046102 (11 pages), 2006
82. L. Kocarev, F. Lehmann, G.M. Maggio, B. Scanavino, Z. Tasev, and A. Vardy, "Nonlinear Dynamics of Iterative Decoding Systems: Analysis and Applications," *IEEE Transactions on Information Theory*, Vol. 52(4), pp. 1366 – 1384, 2006
83. N. Masuda, G. Jakimoski, K. Aihara, and L. Kocarev, "Chaotic Block Ciphers: from theory to practical algorithms," *IEEE Transactions on Circuits and Systems*, Vol. 53(6), pp. 1341 – 1352, 2006
84. L. Kocarev, J. Szczepanski, J. M. Amigo, and I. Tomovski, "Discrete Chaos – I: Theory", *IEEE Transactions on Circuits and Systems*, Vol. 53(6), pp. 1300 – 1309, 2006
85. A. Fekete, G. Vattay, and L. Kocarev, "Traffic dynamics in scale-free networks", *ComPlexUs*, Vol. 3(1-3), pp. 97 – 107, 2006
86. D. Yu, M. Righero, and L. Kocarev, "Estimating topology of networks," *Physical Review Letters*, Vol. 97, pp. 188701 (4 pages), 2006 (also published in *Virtual Journal of Biological Physics Research*).
87. J. M. Amigo, L. Kocarev, and I. Tomovski, "Discrete entropy," *Physica D*, Vol. 228, pp. 77 – 85, 2007

88. J. M. Amigo, L. Kocarev, and J. Szczepanski, "Theory and Practice of Chaotic Cryptography," *Physics Letters A*, Volume 366, Issue 3, pp. 211 – 216, 2007
89. J. M. Amigo, L. Kocarev, J. Szczepanski, "Discrete Lyapunov exponent and resistance to differential cryptanalysis," *IEEE Transactions on Circuits and Systems*, part II, Volume 54, Issue 10, pp. 882 – 886, October 2007
90. L. Pejov, M. La Rosa, and L. Kocarev, "Dynamics of the central phenylene ring torsional motion in phenylene ethynylene oligomers. A quantum - theoretical contribution to the study of conformational basis for single – molecule switching phenomena," *Chemical Physics*, Vol. 340, Issue 1-3, pp. 1 – 11, 2007
91. G. S. Duane, D. Yu, and L. Kocarev, "Identical synchronization, with translation invariance, implies parameter estimation," *Physics Letters A*, Volume 371, Issues 5-6, 26, Pages 416 – 420, 2007
92. P. Checco, M. Biey, and L. Kocarev, "Synchronization in random networks with given expected degree sequences," *Chaos, Solitons, and Fractals*, Vol. 35, pp. 562 – 577, 2008
93. J. Amigo, L. Kocarev, and J. Szczepanski, "On some properties of the discrete Lyapunov exponent", *Physics Letters A*, Volume 372, Issue 41, Pages 6265 – 6268, 2008
94. Y. Liu, K.S. Tang and L. Kocarev, "An adaptive observer design for auto-synchronization of Lorenz System," *International Journal of Bifurcation and Chaos*, Volume 18, No 8, pp. 2415 – 2423, 2008
95. I. Petreska, L. Pejov, and L. Kocarev, "Controlling the torsional stochastic switching in phenylene ethynylene oligomer molecules by external electrostatic fields", *Phys. Rev. B*, Volume 78, 045209 (5 pages), 2008 (also published in Virtual Journal)
96. P. Checco, M. Righero, M. Biey, and L. Kocarev, "Synchronization in Networks of Hindmarsh–Rose Neurons", *IEEE Transactions on Circuits and Systems II: Express briefs*, Vol. 55, No. 12, pp. 1274 – 1278, 2008
97. D. Gligoroski, S. Markovski, and L. Kocarev, "Edon-R: An Infinite Family of Cryptographic Hash Functions", *International Journal of Network Security*, Volume 8 (3), p. 293 – 300, 2009
98. T. Addabbo and L. Kocarev, "Periodic Dynamics in State Dependent Queuing Networks", *Chaos, Solitons, and Fractals*, Volume 41, Issue 4, Pages 2178 – 2192, 2009
99. Y. Mao, W. Tang, Y. Liu and L. Kocarev, "Identification of biological neurons using adaptive observers", *Cognitive processing*, Vol. 10 (Suppl 1), pages: 41 – 53, 2009
100. N. Zlatanov and L. Kocarev, "Random walks on networks: Cumulative distribution of cover time", *Physical Review E* 80, 041102 (8 pages), 2009
101. Y. Liu, Y. Mao, W. Tang, L. Kocarev, "Communication schemes by dynamical minimization algorithm" *International Journal of Bifurcation and Chaos*, Volume 19, Issue 7 Pages 2429 – 2437, 2009
102. D. Smilkov and L. Kocarev, "Rich-club and page-club coefficients for directed graphs", *Physica A*, Volume 389, Pages 2290 – 2299, 2010

103. I. Petreska, I. Tomovski, E. Gutierrez, L. Kocarev, F. Bono, K. Poljansek, "Application of modal analysis in assessing attack vulnerability of complex networks", *Communications in Nonlinear Science and Numerical Simulation* (Elsevier), Volume 15, Issue 4, Pages 1008 –1018, 2010
104. D. Trpevski, W. K. S. Tang, and L. Kocarev, "Model for rumor spreading over networks", *Physical Review E* 81, 056102 (11 pages), 2010
105. D. Trpevski, D. Smilkov, I. Mishkovski, and L. Kocarev, "Vulnerability of labeled networks", *Physica A: Statistical Mechanics and its Applications* Volume 389, Issue 23, Pages 5538 – 5549, 2010
106. L. Kocarev, N. Zlatanov and D. Trajanov, "Vulnerability of networks of interacting Markov chains", *Phil. Trans. R. Soc. A* 368, 2205 – 2219, 2010
107. L. Kocarev and V. In, "Network science: A new paradigm shift", *IEEE Network*, vol. 24(6), pages: 6 – 9, 2010
108. I. Mishkovski, M. Biey, and L. Kocarev, "Vulnerability of complex networks", *Communications in Nonlinear Science and Numerical Simulation* (Elsevier), Volume 16, Issue 1, Pages 341 – 349, 2011
109. I. Petreska, L. Pejov, and L. Kocarev, "Exploring the possibilities to control the molecular switching properties and dynamics: A field-switchable rotor-stator molecular system", *Journal of Chemical Physics* 134, 014708 (12 pages), 2011
110. D. Smilkov and L. Kocarev, "Analytically solvable processes on networks", *Physical Review E* 84, 016104 (8 pages) 2011
111. T. Addabbo, A. Fort, L. Kocarev, S. Rocchi, V. Vignoli, "Pseudo-Chaotic Lossy Compressors for True Random Number Generation", *IEEE Transactions on Circuits and Systems I: Regular Papers*, Volume 58, Issue 8, Page(s): 1897 – 1909, 2011
112. A. Stanoev, D. Smilkov, L. Kocarev, "Identifying communities by influence dynamics in social networks", *Physical Review E*, 84, 046102 (10 pages), 2011
113. I. Miskovski, M. Righero, M. Biey, and L. Kocarev, "Enhancing robustness and synchronizability of networks homogenizing their degree distribution", *Physica A*, Vol. 390, Issues 23-24, p. 4610 – 4620, 2011
114. D. Smilkov and L. Kocarev, "Influence of the network topology on epidemic spreading", *Physical Review E* 85, 016114 (10 pages), 2012
115. I. Tomovski and L. Kocarev, "Simple Algorithm for Virus Spreading Control on Complex Networks", *IEEE Transactions on Circuits and Systems I: Regular Papers*, Volume: 59, Issue: 4, Page(s): 763 – 771, 2012
116. M. Mirchev, G. Duane, W. Tang, and L. Kocarev, "Improved modeling by coupling imperfect models", *Communications in Nonlinear Science and Numerical Simulation* (Elsevier), Volume 17, Pages 2741 – 2751, 2012
117. L. Basnarkov and L. Kocarev, "Forecast improvement in Lorenz 96 system", *Nonlin. Processes Geophys.*, Volume 19, 569–575, 2012