CURRICULUM VITAE
Peter Horak

Specialization

Discrete Mathematics, Coding Theory, Cryptography, and Theoretical Computer Science

Education - Degree Information

DrSc.(equivalent to D.Sc.), Comenius University, Bratislava, Slovakia 1995
CSc. (equivalent to Ph.D.), Comenius University, Bratislava, Slovakia 1980
RNDr.(equivalent to M.Sc.) Comenius University, Bratislava, Slovakia 1975
BSc., Comenius University, Bratislava, Slovakia 1974

Employment Record

a) Regular positions

1. 16-03-2003 to date, IAS, University of Washington, Tacoma, Associate Professor, since 2005 Professor
2. 15-09-95 to 22-02-2003, Dept. of Mathematics, Kuwait University, Associate Professor since 1999 Professor
3. 01-09-75 to 15-09-95, Dept. of Mathematics, Slovak Technical University, Slovakia, Assistant Professor since 1983 Associate Professor

b) Visiting positions

1. 06-09-08 to 08-15-08, Univ. of Hawaii, USA, Visiting Prof.
2. 08-18-06 to 09-23-06, Univ. of Newcastle, Australia, Visiting Scientist
3. 06-06-05 to 08-12-05, Univ. of Hawaii, USA, Visiting Prof.
4. 11-06-01 to 10-08-01, Univ. of Hawaii, USA, Visiting Prof.
5. 10-06-99 to 13-08-99, Univ. of Hawaii, USA, Visiting Prof.
6. 03-07-98 to 17-08-98, Univ. of Newcastle, Australia, Visiting Scientist
7. 10-08-96 to 12-09-96, Univ. of Newcastle, Australia, Visiting Scientist
8. 24-06-96 to 06-08-96, Univ. of Hawaii, Visit. Associate Prof.
9. 01-06-94 to 02-08-94, Univ. of Hawaii, Visit. Associate Prof.
10. 01-09-93 to 15-05-94, Southern Illinois Univ. USA ,Visiting Associate Prof.
11. 01-01-93 to 31-08-93, Simon Fraser Univ., Canada, Visiting Associate Prof.
12. 01-09-90 to 31-05-91, Simon Fraser Univ., Canada, Visiting Associate Prof.
13. 19-08-89 to 15-05-90, University of Nebraska, USA, Visiting Associate Prof.
14. 01-01-87 to 30-06-87, McMaster University, Canada,Visiting Scientist

PhD Students

Co-advisor/advisor of the following PhD students:
Dr. Leticia B. Rodriguez, thesis defense Dec. 2009 at the Federal University of Rio de Janeiro. She was awarded the 2nd prize in the contest of PhD theses held by the Brazilian CS Society.

Dr. Catarina Cruz, March 2016 at the University of Aveiro, Portugal.
Dr. Viliam Hromada, Aug. 2014, Mr. Eugen Antal, April 2017, and Dr. Tomas Fabsic; October 2017 at Slovak University of Technology, Bratislava, Slovakia.
Dr. Fabsic was Student Personality of Slovakia Laureate for AY 2016/2017 not only in the category Informatics and Mathematics but also the overall laureate among all 12 categories.

Honors and Awards

- Recipient of 2015 Distinguished Research Award at UWT

- NATO grant.

In 2018, the NATO Science for Peace and Security (SPS) Programme celebrated its 60th Anniversary. On this occasion, the SPS Prize was awarded to three outstanding SPS multi-year projects, which were successfully completed in the last 10 years in the SPS Key priorities areas: (i) Chemical, Biological, Radiological and Nuclear (CBRN), (ii) Cyber Defence, and (iii) Advanced Technologies. I was a member of the project 'Secure Implementation of Post-Quantum Cryptography' team, led by Prof. O. Grosek, that was funded by NATO for the period 2013-2016. This project received the NATO SPS 2018 prize in the area of Cyber Defence.

- Member of the editorial board:

  Journal of Combinatorial Designs, Wiley &Sons, USA, since 2008 - 2019.

  Mathematica Slovaca, Springer Verlag / De Gruyter, Germany, since 2007.

  Journal of Combinatorial Mathematics and Combinatorial Computing, Charles Babbage Research Center, Canada, 1994 - 2020.

  International Journal of Mathematics & Statistics, CESER Publications, India, since 2014; 2015-2019 an Associate Chief Editor.

  Journal of Combinatorics, Information and System Sciences, MD Publications PVT, India, 1993 - 2011.

  Guest editor of the volume 309, Issue 18, 2009, of Discrete Mathematics

- Reviewer for Zentralblatt für Mathematik and Mathematical Reviews. Referee for many journals including all leading ones in Discrete Mathematics: J. Combinatorial Theory Series A and Series B; J. Graph Theory; J. Combinatorial Designs; Discrete Mathematics; European J. of Combinatorics; SIAM J. on Discrete Mathematics; Graphs and Combinatorics; Combinatorica; Ars Combinatoria; Australasian J. of Combinatorics; J. Combinatorial Optimization; Discussiones Mathematicae Graph Theory; Discrete Mathematics & Theoretical Computer Science; IEEE Transactions on Information Theory; Theoretical Computer Science; Utilitas Mathematica; Linear Algebra and its Applications; etc.

- Reviewer for *NSERC* (Canada) and *National Security Agency* (USA) grant applications.

Invited Lectures

- *Australia:* University of Newcastle, NSW 1996, 1998.

- *Austria*: Technische Universität Wien 2011.

- *Brazil*: Federal University, Rio de Janeiro 2000, 2007; Federal University, Goiania 2007.

- *Canada*: University of Calgary 1987, 1990; Simon Fraser University, Vancouver 1987, 1989, 2005, 2010, 2019; University of Toronto 1987; Universite de Montreal 1991; University of Regina 2000; McMaster University, Hamilton 2003, 2005, 2007, 2009, 2010, 2012, 2019; University of Victoria 2006, 2010; Ryerson University 2015.

- *China*: Zhejiang Normal University, Jinhua, 2013; National University of Defense Technology, Changsha, 2018.

- *Czech Republic:* Charles University, Prague 1997, 2011, 2013.

- *Germany:* University of Augsburg 2013.

- *Hungary:* Mathematical Institute of the Hungarian Academy of Sciences 1994, 2011, 2016.

- *Israel:* Ben Gurion University, Beer'sheva 2011, Ariel University, 2016, Tel Aviv University, 2017, Tel Aviv University 2024.
- *Italy*: University of Catania 2007; University of Messina 2008.
- *Japan*: Science University, Tokyo 2004; Keio University, Yokohama 2004.
- *Kuwait:* Kuwait University 2005, 2009, 2011, 2015, 2019.
- *Malta:* University of Malta, 2019.
- *Netherlands:* University of Groningen 2008; Technishe Universiteit Eindhoven 2008.
- *New Zealand:* University of Otago, Dunedin 2000.
- *Norway*: University of Bergen 2012, 2014, **2022**.
- *Oman:* Sultan Qabus University 2001.
- *Poland*: Mathematical Institute of AGH Krakow 1995.
- *Portugal*: University of Aveiro 2008, 2011.
- *Puerto Rico:* University of Puerto Rico 2005, 2006, 2010.
- *Russia:* Economic University, Nizny Novgorod 2011.
- *Slovakia:* Comenius University 2009; Slovak University of Technology 2007, 2011.
- *Slovenia:* University of Ljubljana 2010; University of Primorska, Koper 2018.
- *Spain*: Universidad Rey Juan Carlos, Madrid, Spain, 2019.
- South *Africa*, University of Cape Town 2011.
- *Taiwan:* National Sun Yat-sen University, Kaohsiung 1996, 2007; National Chiao Tung University, Hsinchu 1996, 2007; Academica Sinica, Taipei 1996; National Dong Hwa University, Haulien 2007.

- *USA:* Emory University, Atlanta 2004, 2006, 2008, 2009; Georgia Institute of Technology, Atlanta 2004, 2009; University of Hawaii 2011, 2013; University of Illinois at Champaign/Urbana 2008; University of Illinois at Chicago 1994; University of Nebraska, Lincoln 1990, 1994; Auburn University, Alabama 2003, 2004, 2006, 2008, 2009, 2010, 2011, 2012; Southern Illinois University, Carbondale 1991, 2004; University of West Georgia, Carrollton 2004; Illinois State University, Normal 2004, 2008.

- *Zimbabwe:* University of Zimbabwe, Harare 2001.

LIST OF PUBLICATIONS

Peter Horak

Peer-reviewed journals

1. P. Horak, Digraphs maximal with respect to connectivity, *Mathematica Slovaca* 2 (1979), 87-90.

2. P. Horak, L. Tovarek, On hamiltonian cycles of complete n-partite graph, *Mathematica Slovaca* 29 (1979), 43-47.

3. P. Horak, J. Širáň, Note on a new coloring number of a graph, *Journal of Graph Theory* 4 (1980), 111-113.

4. P. Horak, Enumeration of graphs maximal with respect to connectivity, *Mathematica Slovaca* 32 (1982), 81-84.

5. P. Horak, Digraphs maximal with respect to arc connectivity, *Mathematica Slovaca* 32 (1982), 243-253.

6. P. Horak, Latin parallelepipeds and cubes, *Journal of Combinatorial Theory Ser. A* 33 (1982), 213-214.

7. P. Horak, J. Širáň, On a modified concept of thickness of a graph, *Mathematische Nachrichten* 108 (1982), 305-306.

8. P. Horak, Generalized uniformly line vulnerable digraphs, *Časopis pro Pěstování Matematiky* 107 (1982), 407-411.

9. P. Horak, L. Niepel, A short proof of a linear arboricity theorem for cubic graphs, *Acta Mathematica Universitatis Comenianae* 40 (1982), 275- 277.

10. P. Horak, A note on a removing point of a strong digraph, *Mathematica Slovaca* 33 (1983), 85-86.

11. P. Horak, J. Širáň, On a construction of Thomassen, *Graphs and Combinatorics* 2 (1986), 347-350.

12. J. Širáň, P. Horak, A construction of thickness minimal graphs, *Discrete Mathematics* 64 (1987), 263-268.

13. P. Horak, A generalization of Hall's theorem, *Journal of Combinatorial Mathematics and Combinatorial Computing* 2 (1987), 223-233.

14. P. Horak, Subgraphs intersecting any hamiltonian cycle, *Journal of Combinatorial Theory Ser. B* 44 (1988), 75-86.

15. P. Horak, A. Rosa, Decomposing Steiner systems into small configurations, *Ars Combinatoria* 26 (1988), 91-105.

16. K. Heinrich, P. Horak, A. Rosa, On Alspach's conjecture, *Discrete Mathematics* 77 (1989), 97-121.

17. P. Horak, D. Kreher, A. Rosa, Jointly extendable Latin rectangles, *Utilitas Mathematica* 36 (1989), 193-195.

18. P. Horak, J. Širáň, Solution of two problems of P. Erdős concerning hamiltonian cycles, *Discrete Mathematics* 84 (1990), 23-29.

19. P. Horak, Z. Tuza, A coloring problem related to Erdős, Faber, Lovasz conjecture, *Journal of Combinatorial Theory Ser. B* 50 (1990), 321-322.

20. P. Horak, Extending partial systems of distinct representatives, *Discrete Mathematics* 91 (1991), 95-98.

21. P. Horak, Maximally nonhamiltonian graphs, *Journal of Combinatorial Mathematics and Combinatorial Computing* 9 (1991), 167-173.

22. P. Horak, Common k-transversals of finite families, *Acta Mathematica Universitatis Comenianae* 60 (1991), 253-256.

23. P. Horak, N. Sauer, Covering complete graphs by cliques, *Ars Combinatoria* 33 (1992), 279-288.

24. P. Horak, H. Qing, W. T. Trotter, Induced matchings in cubic graphs, *Journal of Graph Theory* 17 (1993), 151-160.

25. P. Horak, Z. Tuza, Large s-representable set systems with low maximum degree, *Discrete Mathematics* 122 (1993), 205-215.

26. H. Fleischner, P. Horak, J. Širáň, Generating hamiltonian cycles in complete graphs, *Acta Mathematica Universitatis Comenianae* 62 (1993), 155-159.

27. K. Heinrich, P. Horak, Euler's theorem, *The American Mathematical Monthly* 101 (1994), 260-261.

28. E. Bertram, P. Erdős, P. Horak, J. Širáň, Z. Tuza, Local and global average degree in graphs and multigraphs, *Journal of Graph Theory* 18 (1994), 647-661.

29. P. Horak, X. Zhu, Isomorphic factorization of trees of maximum degree three, *Journal of Combinatorial Mathematics and Combinatorial Computing* 16 (1994), 171-191.

30. K. Heinrich, P. Horak, Isomorphic factorizations of trees, *Journal of Graph Theory* 19 (1995), 187-199.

31. R. Brualdi, G. Hahn, P. Horak, E. Kramer, P. Mallendorf, D. Mesner, On a matrix partition conjecture, *Journal of Combinatorial Theory Ser. A* 69 (1995), 333-346.

32. P. Horak, W. Wallis, A new approach to a covering problem, *Utilitas Mathematica* 47 (1995), 173-184.

33. K. Heinrich, P. Horak, W. Wallis, Quinlin Yu, Perfect double covers with paths of length four, *Journal of Graph Theory* 21 (1996), 187-197.

34. E. Bertram, P. Horak, Lower bounds on the independence number, *Geombinatorics* 5 (1996), 93-98.

35. P. Horak, J. Širáň, W. Wallis, Decomposing cubes, *Journal of the Australian Mathematical Society Ser. A* 61 (1996), 119-128.

36. A. Cerny, P. Horak, A. Rosa, S. Znam, Maximal Pentagonal Packings, *Acta Mathematica Universitatis Comenianae* 65 (1996), 215-227.

37. A. Cerny, P. Horak, W. Wallis, Kirkman's School Projects, *Discrete Mathematics* 167/169 (1997), 189-196.

38. P. Horak, On a coloring problem of P. Erdős, *Journal of Combinatorial Mathematics and Combinatorial Computing* 24 (1997), 209-211.

39. E. Bertram, P. Horak, Decomposing 4-regular graphs into triangle free 2-factors, *SIAM Journal on Discrete Mathematics* 10 (1997), 309-317.

40. P. Horak, N. Phillips, W. Wallis, J. Yucas, Counting frequencies of small configurations in Steiner systems, *Ars Combinatoria* 46 (1997), 65-75.

41. P. Horak, A. Rosa, J. Širáň, Maximal orthogonal Latin rectangles, *Ars Combinatoria* 47 (1997), 129-145.

42. Z. Furedi, P. Horak, C. M. Pareek, X. Zhu, Maximal oriented graphs of diameter 2, *Graphs and Combinatorics* 14 (1998), 345-350.

43. P. Horak, L. Brankovic, M. Miller, A combinatorial problem in database security, *Discrete Applied Mathematics* 91 (1999), 119-126.

44. P. Horak, C. Lindner, A small embedding for partial even-cycle systems, *Journal of Combinatorial Designs* 7 (1999), 205-215.

45. P. Horak, D. Pike, M. Raines, Hamiltonian cycles in block- intersection graphs of triple systems, *Journal of Combinatorial Designs* 7 (1999), 243-246.

46. E. Bertram, P. Horak, Some applications of graph theory to other parts of mathematics, *Mathematical Intelligencer* 21 (1999), 6-11, and (in Italian) Lett. Mat. Pristem No. 35 (2000), 29–33.

47. P. Gvozdjak, P. Horak, M. Meszka, Z. Skupien, On the strong chromatic index of cyclic multigraphs, *Discrete Applied Mathematics* 99 (2000), 23-38.

48. L. Brankovic, P. Horak, M. Miller, An optimization problem in statistical databases, *SIAM Journal on Discrete Mathematics* 13 (2000), 346-353.

49. P. Horak, K. Heinrich, Partitioning Infinite Trees, *Journal of Graph Theory* 34 (2000), 113-127.

50. P. Gvozdjak, P. Horak, M. Meszka, Z. Skupien, Strong chromatic index for multigraphs, *Utilitas Mathematica* 57 (2000), 21- 32.

51. E. Dalhaus, P. Horak, M. Miller, J. Ryan, The train marshaling problem, *Discrete Applied Mathematics* 103 (2000), 41-54.

52. P. Horak, L. Stacho, A lower bound on the number of Hamiltonian cycles, *Discrete Mathematics* 222 (2000), 275-280.

53. P. Horak, E. Bertram, S. Mohammed, Small 2-factors of bipartite graphs, *Ars Combinatoria* 58 (2001), 126-146.

54. L. Brankovic, P. Horak, M. Miller, A. Rosa, Premature Latin squares, *Ars Combinatoria* 63 (2002), 175-184.

55. P. Horak, S. Mohammed, Halving families of sets, *Journal of Combinatorial Mathematics and Combinatorial Computing* 41 (2002), 245-254.

56. P. Horak. R. Aldred, H. Fleischner, Completing Latin squares: critical sets, *Journal of Combinatirial Designs* 10 (2002), 419-432.

57. B. AlBdaiwi, P.Horak, Perfect distance-d placements in 3-dimensional tori, *Journal of Combinatorial Mathematics and Combinatorial Computing* 43 (2002), 159-174.

58. P. Horak, Decomposing Eulerian Graphs, *Journal of Combinatorial Mathematics and Combinatorial Computing* 47 (2003), 189-200.

59. O. Grosek, P.Horak, Tran van Trung, On non-polynomial Latin squares, *Designs, Codes, and Cryptography* 32 (2004), 217-226.

60. P. Horak, R. Nedela, A. Rosa, The hamilton-Waterloo problem: The case of hamiltonian cycles and triangle-factors, *Discrete Mathematics* 284 (2004), 181-188.

61. P. Horak, On the chromatic number of Steiner Triple Systems of order 25, *Discrete Mathematics* 299 (2005), 120 - 128.

62. P. Horak, A.Rosa, Extended Petersen graphs, *Discrete Mathematics* 299 (2005), 129 - 140.

63. P. Horak, T. Kaiser, M. Rosenfeld, Z. Ryjacek, The prism over the middle-levels graph is hamiltonian, *Order* 22 (2005), 73 - 81.

64. P. Horak, B. AlBdaiwi, Fast decoding quasi-perfect Lee distance codes, *Designs, Codes, and Cryptography* 40 (2006), 357 - 367.

65. P. Horak, I. Dejter, Completing Latin squares: critical sets II, *Journal of Combinatirial Designs* 15 (2007), 77 - 83.

66. P. Horak, K. McAvaney, On covering vertices of a graph by trees, *Discrete Mathematics* 308 (2008), 4414-4418.

67. M. Giofriddo, P. Horak, M. Milazzo, A. Rosa, Equitable specialized block-colourings for Steiner triple systems, *Graphs and Combinatorics* 24 (2008), 313-326.

68. P. Horak, Tilings in Lee metric, *European Journal of Combinatorics* 30 (2009), 480-489.

69. P. Horak, A. Rosa, On a problem of Marco Buratti, *Electronic Journal of Combinatorics* R20, 2009.

70. B. AlBdaiwi, P. Horak, M. Milazzo, Enumerating and decoding perfect Lee codes, *Designs, Codes, and Cryptography* 52 (2009), 155-162.

71. O. Grosek, P. Horak, P. Zajac, On Complexity of Round Transformations, *Discrete Mathematics* 309 (2009), 5527-5534.

72. P. Horak, On Perfect Lee Codes, *Discrete Mathematics* 309 (2009), 5551-5561.

73. P. Horak, Error correcting codes and Minkowski's conjecture, *Tatra Mountains Mathematical Publications* 45 (2010), 37-49.

74. L. R. Bueno, P. Horak, On hamiltonian cycles in the prism over the odd graphs, *Journal of Graph Theory* 68 (2011), 177-188.

75. P. Horak, B. AlBdaiwi, Non-periodic tilings of R^n by crosses, *Discrete & Computational Geometry* 47 (2012), 1–16.

76. O. Grosek, P.Horak, On quasigroups with few associative triples, *Designs, Codes, and Cryptography* 64 (2012), 221-227.

77. P. Horak, B. AlBdaiwi, Diameter perfect Lee codes, *IEEE Transactions on Information Theory* 58 (2012) 5490-5499.

78. C. Araujo-Martinez, I. J. Dejter and P. Horak, A generalization of Lee codes, *Designs, Codes, and Cryptography* 70 (2014), 77-90.

79. P. Horak. O. Grosek, A new approach towards the Golomb-Welch conjecture, *European Journal of Combinatorics* 38 (2014), 12-22.

80. P. Horak, V. Hromada, Tling R^5 by crosses, *Discrete & Computational Geometry* 51 (2014), 269-284.

81. P.Horak, On graphs with many cycles, *Discrete Mathematics* 331 (2014), 1–2.

82. P. Horak, Z. Tuza, Speeding up deciphering by hypergraph ordering, *Designs, Codes, and Cryptography* 75 (2015), 175-185.

83. P. Horak, Partitioning R^n into connected components, *The American Mathematical Monthly* 122 (2015), 280 - 283.

84. P. Horak, V. Hromada, On a tiling paradox, *Journal of Combinatorial Mathematics and Combinatorial Computing* 96 (2016), 65-102.

85. E. Antal, O. Grošek, P.Horak, On a mnemonic construction of permutations, Journal of Mathematical Cryptology 11 (2017), no.1, 45-53.

86. P. Horak, I. Semaev, Zs. Tuza, A combinatorial problem related to sparse systems of equations, Designs, Codes, and Cryptography 85 (2017), 129-144 .

87. P. Horak, D-R. Kim, 50 years of Golomb and Welch Conjecture, IEEE Transactions on Information Theory 64 (2018), 3048-3061.

88. S. Hodžić, P. Horak, E. Pasalic, Characterization of basic 5-value spectrum functions through Walsh-Hadamard transform,IEEE Transactions on Information Theory 67 (2021), no. 2, 1038–1053.

89. O. Grošek, V. Hromada, P.Horak, A cipher based on prefix codes, MDPI press, Sensors 21 (2021) 21, 6326.

90. P. Horak, D-R. Kim, Connected cubic graphs with the maximum number of perfect matchings, Journal of Graph Theory, 99 (2022), 671-690.

91. P. Horak, D-R. Kim, Keller's conjecture revisited, International Electronic Journal of Geometry, 15 no. 2 (2022), 173–177.

92. P. Horak, V. Hromada, O. Grošek, On the maximum size of a prefix code, IEEE Transactions on Information Theory 67 (2023), 2855 - 2859.

93. S. Spacapan, P.Horak, On prism - hamiltonian bipartite graphs, Australian J. of Combinatorics 88 (2024), 194-203**.**

Peer-reviewed special volumes

94. P. Horak, Transversals and Matroids, in " *Topics in Combinatorics and Graph Theory*" (R.Bodendiek, R.Henn eds.) Physik Verlag Heidelberg, 1990, pp. 381-389.

95. P. Horak, The strong chromatic index of graphs with maximum degree four, in "*Contemporary methods in Graph Theory*" (R.Bodendieck ed.) B.I.Wissenschaftsverlag, 1990, pp 399-405.

96. P. Horak, A. Rosa, Maximal partial Latin squares, in "*Graphs, Matrices, and Designs*" (R.Rees ed.), 1993, 225-233.

Peer-reviewed conference proceedings

97. L. Brankovic, P. Horak, M. Miller, D. Wrightson, Usability of compromise-free statistical databases, In "*Proceedings of the 9th International Conference on Scientific and Statistical Database Management*", IEEE Press, 1997, pp 144-154.

98. C. Araujo-Martinez, I. J. Dejter and P. Horak, A generalization of Lee codes, in *"Proceedings of the 3rd. International Castle Meeting on Coding Theory and Applications"*, Cardona, Spain, (eds. J. Borges and M. Villanueva), September 2011, pp. 27–32.

99. P. Horak, I. Semaev, Z. Tuza, An application of Combinatorics in Cryptography, *Electronic Notes in Discrete Mathematics* (2015), 31-35 (extended abstract).

Commemorating Papers

100. P. Horak, Remembering Professor Znam 9. 2. 1936 - 17. 7. 2003, Math. Slovaca 73 (2023), 1097 - 1098.

Books and Encyclopaedias

P. Horak, L. Niepel, Review of Mathematics, Alfa, 1983, 600 pp. (In Slovak)

P. Horak, Prime Numbers, in: Encyclopedia of Mathematics Education (ed. L.S. Grinstein, S. J. Lipsey), RoutledgeFalmer 2001.