



Professor Alexander Meduna

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General Orientation

Theoretical Computer Science

Areas of Special Interest

Formal languages, Compilers

Education

Ph.D. in Computer Science
1988

Brno University of Technology
Brno, Czech Republic

M.S. in Computer Science
1982

Palacky University
Olomouc, Czech Republic

B.S. in Computer Science
1981

Palacky University
Olomouc, Czech Republic

Professional carrier

Full Professor

2005 - present

Brno University of Technology
Department of Computer Science
Brno, Czech Republic

Associate Professor

1998 - 2005

Brno University of Technology
Department of Computer Science
Brno, Czech Republic

Senior Researcher

1996 - 1998

Brno University of Technology
Computing Center
Brno, Czech Republic

Visiting Assistant Professor

1988 - 1996

University of Missouri–Columbia
Department of Computer Science
Columbia, MO, USA

Senior Researcher

1985 - 1988

Brno University of Technology
Computing Center
Brno, Czech Republic

Researcher

1982 - 1985

Palacky University
Laboratory of Computer Science
Olomouc, Czech Republic

Classes Taught

2003 – present

- ◇ Compiler Construction
- ◇ Formal Languages
- ◇ Modern Theoretical Science

Brno University of Technology
Department of Computer Science
Brno, Czech Republic

1999 – 2005

- ◇ Principles of Compiler Design

Brno University of Technology
Computing Center
Brno, Czech Republic

1999 – 2001

- ◇ Theoretical computer science

Brno University of Technology
Computing Center
Brno, Czech Republic

1988 – 1996

- ◇ CS341 Automata Theory I
- ◇ CS441 Automata Theory II
- ◇ CS343 Compilers I
- ◇ CS443 Compilers II
- ◇ CS345 Principles of Programming Languages
- ◇ CS352 Operating System Theory

University of Missouri–Columbia
Department of Computer Science
Columbia, MO, USA

1985 – 1988

◇ Automata and compilers

Brno University of Technology
Computing Center
Brno, Czech Republic

1982 – 1985

◇ Compilers

Palacky University
Laboratory of Computer Science
Olomouc, Czech Republic

Publications

Books

- Meduna, A., Horáček, P., Tomko, M.: *Handbook of Mathematical Models for Languages and Computation*. The Institution of Engineering and Technology, 2020
- Meduna, A., Soukup, O.: *Modern Language Models and Computation: Theory with Applications*. Springer, 2017
- Meduna, A., Zemek, P.: *Regulated Grammars and Automata*. Springer, 2014
- Meduna, A.: *Formal Languages and Computation: Models and Their Application*. Taylor & Francis, 2014
- Meduna, A., Techet, J.: *Scattered Context Grammars and Their Applications*. WIT Press, UK, 2010
- Meduna, A., Zemek, P.: *Regulated Grammars and Their Transformations*. The FIT BUT press, CZ, 2010
- Meduna, A.: *Elements of Compiler Design*. Taylor & Francis, 2008 (translated into Chinese in 2009)
- Meduna, A., Kopeček, T.: *Conditional Grammars and Their Reduction*. The FIT BUT press, CZ, 2009
- Meduna, A., Švec, M.: *Grammars with Context Conditions and Their Applications*. Wiley, 2005
- Meduna, A.: *Automata and Languages: Theory and Applications*. Springer, 2000

Book Chapters

- Meduna, A., Zemek, P.: One-Sided Random Context Grammars: A Survey, in *Computing with New Resources*, Springer Verlag, p. 338-351, 2014
- Meduna, A., Zemek, P.: One-Sided Random Context Grammars with Leftmost Derivations, in *Languages Alive - Essays Dedicated to Jürgen Dassow on the Occasion of His 65th Birthday*, Springer, p. 160-173, 2012
- Meduna, A., Leupold, P.: Finitely Expandable Deep PDAs, in *Automata, Formal Languages and Algebraic Systems*, World Scientific Publishing, p. 113-123, 2010
- Meduna, A., Kolář, D.: Descriptive Complexity of Parallel Grammars with Respect to the Number of Nonterminals, in *Words, Sequences, Languages: Where Computer Science, Biology, and Linguistics Meet* (Carlos Martin-Vide, ed.), Kluwer, p. 212-225, 2001
- Meduna, A., Kolář, D.: Descriptive complexity of multi-parallel grammars with respect to the number of nonterminals, in *Grammars and Automata for String Processing: from Mathematics and Computer Science to Biology and Back*, p. 212-225, 2000
- Meduna, A.: On the Number of Nonterminals in Matrix Grammars with Leftmost Derivations, in *New Trends in Formal Languages: Control, Cooperation, and Combinatorics*, Springer, p. 27-39, 1997
- Meduna, A.: Symbiotic E0L Systems, in *Artificial Life* (Gh. Paun, ed.), Black Sea University Press, p. 122-129, 1995
- Meduna, A.: Matrix Grammars under Leftmost and Rightmost Restrictions, in *Mathematical Linguistics and Related Topics* (Gh. Paun, ed.), The Publ. House of the Romanian Academy, p. 243-257, 1994

Refereed Journal Articles (since 1987)

- Meduna, A., Kocman, R., Křivka, Z., Nagy, B.: A Jumping $5' \rightarrow 3'$ Watson-Crick Finite Automata Model. *Acta Informatica* (in press)
- Meduna, A., Kolář, D., Tomko, M.: Multi-Island Finite Automata and Their Even Computations. *Kybernetika*, p. 856-877, 2022
- Meduna, A., Martiško, J., Křivka, Z.: CD Grammar Systems with Two Propagating Scattered Context Components Characterize the Family of Context Sensitive Languages. *International Journal of Foundations of Computer Science*, p. 335-348, 2022
- Meduna, A., Havel, M.: On Elimination of Erasing Rules from E0S Grammars. *Computer Science Journal of Moldova*, p. 135-147, 2022
- Meduna, A., Křivka, Z.: Scattered Context Grammars with One Non-Context-Free Production are Computationally Complete. *Fundamenta Informaticae*, p. 361-384, 2021
- Meduna, A., Kocman, R., Křivka, Z.: General CD Grammar Systems and Their Simplification. *Journal of Automata, Languages and Combinatorics*, p. 37-54, 2020
- Meduna, A., Křivka, Z., Kučera, J.: Jumping Pure Grammars. *The Computer Journal*, p. 30-41, 2019
- Meduna, A., Krčmář, R., Kövari, A., Beníčková, Z.: On Operations over Language Families. *Computer Science Journal of Moldova*, p. 255-282, 2019
- Meduna, A., Charvát, L.: Internally Expandable Pushdown Automata and Their Computational Completeness. *Romanian Journal of Information Science and Technology (ROMJIST)*, p. 232-237, 2018
- Meduna, A., Kocman, R., Křivka, Z.: On Double-Jumping Finite Automata and Their Closure Properties. *RAIRO - Theoretical Informatics and Applications - Informatique Théorique et Applications*, p. 185-199, 2018
- Meduna, A., Křivka, Z., Kučera, J.: On $k\#\$\text{-}$ Rewriting Systems. *Romanian Journal of Information Science and Technology (ROMJIST)*, p. 278-287, 2018
- Meduna, A., Soukup, O.: Jumping Scattered Context Grammars. *Fundamenta Informaticae*, p. 51-86, 2017
- Meduna, A., Csuchaj-Varjú, E., Soukup, O.: On Tree-Restricted Regular-Controlled Context-Free Grammars. *International Journal of Computer Mathematics: Computer Systems Theory*, p. 147-163, 2017
- Meduna, A., Křivka, Z., Zemek, P.: Phrase-Structure Grammars: Normal Forms and Reduction. *The Computer Journal*, p. 1180-1185, 2016
- Meduna, A., Kučera, J.: On State-Synchronized Automata Systems. *Schedae Informaticae*, p. 221-237, 2016
- Meduna, A., Soukup, O.: Simple Matrix Grammars and Their Leftmost Variants. *International Journal of Foundations of Computer Science*, p. 359-373, 2016
- Meduna, A., Soukup, O., Zemek, P.: Ordered Pure Multi-Pushdown Automata. *Theoretical and Applied Informatics*, p. 25-47, 2016
- Meduna, A., Křivka, Z.: Jumping Grammars. *International Journal of Foundations of Computer Science*, p. 709-731, 2015
- Meduna, A., Horáček, P.: New Grammar Systems and Their Application Perspectives. *Schedae Informaticae*, p. 47-68, 2014
- Meduna, A., Koutný, J.: On Normal Forms and Erasing Rules in Path-Controlled Grammars. *Schedae Informaticae*, p. 9-18, 2014
- Meduna, A., Křivka, Z., Tesař, R.: Alan Mathison Turing - život a dílo [in Czech]. *Pokroky matematiky, fyziky a astronomie*, p. 1-19, 2014
- Meduna, A., Vrábel, L., Zemek, P.: Solutions To Four Open Problems Concerning Controlled Pure Grammar Systems. *International Journal of Computer Mathematics*, p. 1156-1169, 2014
- Meduna, A., Zemek, P.: Controlled Finite Automata. *Acta Informatica*, p. 327-337, 2014
- Meduna, A., Zemek, P.: One-Sided Random Context Grammars with a Limited Number of Right Random Context Rules. *Theoretical Computer Science*, p. 127-132, 2014
- Meduna, A., Zemek, P.: Generalized One-Sided Forbidding Grammars. *International Journal of Computer Mathematics*, p. 172-182, 2013
- Meduna, A., Zemek, P.: Left Random Context ET0L Grammars. *Fundamenta Informaticae*, p. 289-304, 2013
- Meduna, A., Zemek, P.: On the Generation of Sentences with Their Parses by Propagating Regular-Controlled Grammars. *Theoretical Computer Science*, p. 67-75, 2013
- Meduna, A., Čermák, M., Horáček, P.: Rule-restricted automaton-grammar transducers: Power and linguistic applications. *Mathematics for Applications*, p. 13-35, 2012
- Meduna, A., Čermák, M., Koutný, J.: Parsing Based on n -Path Tree-Controlled Grammars. *Theoretical and Applied Informatics*, p. 213-228, 2012
- Meduna, A., Horáček, P.: Synchronous Versions of Regulated Grammars: Generative Power and Linguistic Applications. *Theoretical and Applied Informatics*, p. 175-190, 2012
- Meduna, A., Koutný, J.: Tree-controlled Grammars with Restrictions Placed upon Cuts and Paths. *Kybernetika*, p. 165-175, 2012
- Meduna, A., Vrábel, L., Zemek, P.: An Infinite Hierarchy of Language Families Resulting from Stateless Pushdown Automata with Limited Pushdown Alphabets. *Lecture Notes in Computer Science* 7386, p. 236-243, 2012

- Meduna, A., Zemek, P.: Controlled Pure Grammar Systems. *Journal of Universal Computer Science*, p. 2024-2040, 2012
- Meduna, A., Zemek, P.: Jumping Finite Automata. *International Journal of Foundations of Computer Science*, p. 1555-1578, 2012
- Meduna, A., Zemek, P.: Nonterminal Complexity of One-Sided Random Context Grammars. *Acta Informatica*, p. 55-68, 2012
- Meduna, A., Zemek, P.: On One-Sided Forbidding Grammars and Selective Substitution Grammars. *International Journal of Computer Mathematics*, p. 586-596, 2012
- Meduna, A., Zemek, P.: One-Sided Random Context Grammars with Leftmost Derivations. *Lecture Notes in Computer Science* 7300, p. 160-173, 2012
- Meduna, A., Křoustek, J., Židek, S., Kolář, D.: Scattered Context Grammars with Priority. *International Journal of Advanced Research in Computer Science*, p. 1-6, 2011
- Meduna, A., Zemek, P.: One-Sided Random Context Grammars. *Acta Informatica*, p. 149-163, 2011
- Meduna, A., Zemek, P.: Workspace Theorems for Regular-Controlled Grammars. *Theoretical Computer Science*, p. 4604-4612, 2011
- Meduna, A., Čermák, M., Masopust, T.: Some Power-Decreasing Derivation Restrictions in Grammar Systems. *Schedae Informaticae*, p. 23-34, 2010
- Meduna, A., Goldefus, F., Masopust, T.: Left-Forbidding Cooperating Distributed Grammar Systems. *Theoretical Computer Science*, p. 3661-3667, 2010
- Meduna, A., Lukáš, R.: Multigenerative Grammar Systems and Matrix Grammars. *Kybernetika*, p. 68-82, 2010
- Meduna, A., Techet, J.: An Infinite Hierarchy of Language Families Generated by Scattered Context Grammars with n-Limited Derivations. *Theoretical Computer Science*, p. 1961-1969, 2009
- Meduna, A., Masopust, T.: On context-free rewriting with a simple restriction and its computational completeness. *RAIRO - Theoretical Informatics and Applications*, p. 365-378, 2009
- Meduna, A., Masopust, T.: On Pure Multi-Pushdown Automata that Perform Complete Pushdown Pops. *Acta Cybernetica*, p. 537-552, 2009
- Meduna, A., Rychnovský, L.: Infinite Language Hierarchy Based on Regular-Regulated Right-Linear Grammars with Start Strings. *Philippine Computing Journal*, p. 1-5, 2008
- Meduna, A., Techet, J.: Scattered Context Grammars that Erase Nonterminals in a Generalized k-Limited Way. *Acta Informatica*, p. 593-608, 2008
- Meduna, A., Masopust, T., Šimáček, J.: Two Power-Decreasing Derivation Restrictions in Generalized Scattered Context Grammars. *Acta Cybernetica*, p. 783-793, 2008
- Meduna, A., Masopust, T.: On Descriptive Complexity of Partially Parallel Grammars. *Fundamenta Informaticae*, p. 407-415, 2008
- Meduna, A., Bidlo, R., Blatný, P.: Automata with Two-Sided Pushdowns Defined over Free Groups Generated by Reduced Alphabets. *Kybernetika*, p. 21-35, 2007
- Meduna, A., Bidlo, R., Blatný, P.: Context-Free and EOL Derivations over Free Groups. *Schedae Informaticae*, p. 14-24, 2007
- Meduna, A., Kopeček, T., Švec, M.: A formalization of derivation similarity in the formal language theory and its illustration in terms of Lindenmayer systems. *International Journal of Computer Mathematics*, p. 1555-1566, 2007
- Meduna, A., Masopust, T.: Descriptive Complexity of Semi-Conditional Grammars. *Information Processing Letters*, p. 29-31, 2007
- Meduna, A., Masopust, T.: Self-Regulating Finite Automata. *Acta Cybernetica*, p. 135-153, 2007
- Meduna, A., Techet, J.: Canonical Scattered Context Generators of Sentences with Their Parses. *Theoretical Computer Science*, p. 73-81, 2007
- Meduna, A., Křivka, Z., Schöneck, R.: Generation of Languages by Rewriting Systems that Resemble Automata. *International Journal of Foundations of Computer Science*, p. 1223-1229, 2006
- Meduna, A., Lukáš, R.: Multigenerative Grammar Systems. *Schedae Informaticae*, p. 11, 2006
- Meduna, A.: Deep Pushdown Automata. *Acta Informatica*, p. 114-124, 2006
- Meduna, A., Lorenc, L.: Self-Reproducing Pushdown Transducers. *Kybernetika*, p. 533-539, 2005
- Meduna, A., Techet, J.: Generation of Sentences with Their Parses: the Case of Propagating Scattered Context Grammars. *Acta Cybernetica*, p. 11-20, 2005
- Meduna, A., Kopeček, T.: Simple-Semi-Conditional Versions of Matrix Grammars with a Reduced Regulating Mechanism. *Computing and Informatics*, p. 287-302, 2004
- Meduna, A., Vitek, M.: New language operations in formal language theory. *Schedae Informaticae*, p. 123-150, 2004
- Meduna, A.: A Simultaneous Reduction of Several Measures of Descriptive Complexity in Scattered Context Grammars. *Information Processing Letters*, p. 214-219, 2003
- Meduna, A.: On the Degree of Scattered Context-Sensitivity, *Theoretical Computer Science*, p. 2121-2124, 2003

- Meduna, A., Švec, M.: Descriptive Complexity of Generalized Forbidding Grammars. *International Journal of Computer Mathematics*, p. 11-17, 2003
- Meduna, A., Švec, M.: Forbidding EOL Systems. *Theoretical Computer Science*, p. 256-276, 2003
- Meduna, A.: Coincidental Extension of Scattered Context Languages. *Acta Informatica*, p. 307-314, 2003
- Meduna, A.: Simultaneously One-Turn Two-Pushdown Automata. *International Journal of Computer Mathematics*, p. 1-9, 2003
- Meduna, A.: Two-Way Metalinear PC Grammar Systems and Their Descriptive Complexity. *Acta Cybernetica*, p. 126-137, 2003
- Meduna, A., Kolář, D.: Homogeneous Grammars with a Reduced Number of Non-Context-Free Productions. *Information Processing Letters*, p. 253-257, 2002
- Meduna, A., Kolář, D.: One-Turn Regulated Pushdown Automata and Their Reduction. *Fundamenta Informaticae*, p. 399-405, 2002
- Meduna, A., Švec, M.: Reduction of Simple Semi-Conditional Grammars with Respect to the Number of Conditional Productions. *Acta Cybernetica*, p. 353-360, 2002
- Meduna, A.: Descriptive Complexity of Scattered Rewriting and Multirewriting: An Overview. *Journal of Automata, Languages and Combinatorics*, p. 571-577, 2002
- Meduna, A.: Simultaneously One-Turn Two-Pushdown Automata. *International Journal of Computer Mathematics*, p. 111-121, 2002
- Meduna, A., Vurm Petr: Multisequential Grammars with Homogeneous Selectors. *International Journal of Computer Mathematics*, p. 6, 2001
- Meduna, A.: Descriptive Complexity of Partially Parallel Grammars. *DCAGRS*, p. 15-21, 2001
- Meduna, A.: Uniform Generation of Languages by Scattered Context Grammars, *Fundamenta Informaticae*, p. 231-235, 2001
- Meduna, A., Kolář, D.: Regulated Pushdown Automata. *Acta Cybernetica*, p. 653-664, 2000
- Meduna, A.: Context-Free Multirewriting with a Reduced Number of Nonterminals, p. 164, 2000
- Meduna, A.: Generative Power of Three-Nonterminal Scattered Context Grammars. *Theoretical Computer Science*, p. 625-631, 2000
- Meduna, A.: Terminating Left-Hand Sides of Scattered Context Grammars. *Theoretical Computer Science*, p. 423-427, 2000
- Meduna, A.: Prefix Pushdown Automata. *International Journal of Computer Mathematics*, p. 164-182, 1999
- Meduna, A.: Descriptive Complexity of Multi-Continues Grammars. *Acta Cybernetica*, p. 375-384, 1998
- Meduna, A.: Economical Transformations of Scattered Context Grammars to Phrase-Structure Grammars. *Acta Cybernetica*, p. 225-242, 1998
- Meduna, A.: Middle Quotients of Linear Languages. *International Journal of Computer Mathematics*, p. 281-289, 1998
- Meduna, A.: Uniform Rewriting Based on Permutations. *International Journal of Computer Mathematics*, p. 57-74, 1998
- Meduna, A.: Six-Nonterminal Multi-Sequential Grammars Characterize the Family of Recursively Enumerable Languages. *International Journal of Computer Mathematics*, p. 179-189, 1997
- Meduna, A.: Four-Nonterminal Scattered Context Grammars Characterize the Family of Recursively Enumerable Languages. *International Journal of Computer Mathematics*, p. 465-474, 1996
- Meduna, A.: Syntactic Complexity of Context-Free Grammars over Word Monoids. *Acta Informatica*, p. 457-474, 1996
- Meduna, A.: A Trivial Method of Characterizing the Family of Recursively Enumerable Languages by Scattered Context Grammars. *EATCS Bulletin*, p. 104-106, 1995
- Meduna, A.: Symbiotic EOL Systems. *Artificial Life: Grammatical Models*, p. 122-129, 1995
- Meduna, A.: Syntactic Complexity of Scattered Context Grammars. *Acta Informatica*, p. 126-139, 1995
- Meduna, A., Gopalaratnam, A.: On Semi-Conditional Grammars with Productions Having either Forbidding or Permitting Conditions. *Kybernetika*, p. 309-323, 1994
- Meduna, A.: Matrix Grammars under Leftmost and Rightmost Restrictions. *Mathematical Linguistics and Related Topics*, p. 243-257, 1994
- Meduna, A., Crooks, C., Sarek, M.: Syntactic Complexity of Regulated Rewriting. *Kybernetika*, p. 177-186, 1993
- Meduna, A., Csuhanj-Varju, E.: Grammars with Context Conditions. *Kybernetika*, p. 199-213, 1993
- Meduna, A.: Canonical Scattered Rewriting. *International Journal of Computer Mathematics*, p. 122-129, 1993
- Meduna, A.: A Formalization of Sequential, Parallel, and Continuous Rewriting. *International Journal of Computer Mathematics*, p. 24-32, 1992
- Meduna, A.: Symbiotic EOL Systems. *Acta Cybernetica*, p. 164-172, 1992
- Meduna, A.: Controlled Systolic Automata. *Parallel Computation in the Midwestern Academic Environment*, p. 56-66, 1991

- Meduna, A.: Generalized Forbidding Grammars. *International Journal of Computer Mathematics*, p. 31-38, 1990
- Meduna, A.: Global Context Conditional Grammars. *Journal of Automata, Languages and Combinatorics*, p. 31-38, 1990
- Meduna, A.: Parallel Compilers Based on L Systems. *Parallel Computation in the Midwestern Academic Environment*, p. 215-224, 1990
- Meduna, A.: Regulated Rewriting. *Missourian Annual Conference on Computing*, p. 25-31, 1990
- Meduna, A., Horvath, G.: On State Grammars. *Acta Cybernetica*, p. 4-14, 1988
- Meduna, A.: Context-Free Derivations on Word Monoids. *Acta Informatica*, p. 781-786, 1988
- Meduna, A.: Evaluated Grammars. *Acta Cybernetica*, p. 169-176, 1987