

[Personal HOMEPAGE](#)

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**Position**

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Professor  
Department of Mathematics (Applied Mathematics and Computer Science),  
Faculty of Arts and Sciences,  
**Eastern Mediterranean University**,  
Famagusta, North Cyprus (via Mersin-10, Turkey)

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**Fields of interest**

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Digital Geometry, Formal Languages, Automata, Puzzles, Artificial Intelligence, Logical Systems, Bio-inspired Computing, DNA Computing, Algorithms, Graphs, Parallelism, New Computing Paradigms, Digital Image Processing, Soft Computing, Theoretical Computer Science, Discrete Mathematics, Cognitive Sciences

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**Education - Degrees**

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**Habilitation (dr. habil.) in Mathematics and Computer Science, 2007**

University of Debrecen, Debrecen, Hungary  
thesis: *Formal languages, graphs and logical puzzles*

**DEA Exam in Languages and Information Systems, 2006, with grade "excellent"**

Rovira i Virgili University, Tarragona, Spain  
(that is a kind of degree between Master and PhD)

**Ph.D. in Mathematics and Computer Science, 2004, with grade "summa cum laude"**

University of Debrecen, Debrecen  
thesis: *Neighbourhood sequences on different grids*

**M. A. in General and Applied Linguistics, 2000**

University of Debrecen, Debrecen

**M. Sc. in Teacher of Physics, 2000**

University of Debrecen, Debrecen  
(former Kossuth Lajos University)

**M. Sc. in Computer Science, 1999**

Kossuth Lajos University, Debrecen  
thesis: *Word processing exercises for advanced users* (in Hungarian)  
(5-year University degree, it is the continuation of the B.Sc. degree below)

**M. A. in Philosophy with Logic Specialization, 1998**

Kossuth Lajos University, Debrecen  
thesis: *Interval-valued logic* (in Hungarian)  
(5-year University degree, it is equivalent to B.A.+M.A. in the new, Bologna-system)

**B. Sc. in Programming Mathematics, 1997**

Kossuth Lajos University, Debrecen  
thesis: *Timegames* (in Hungarian)  
(3-year College degree, it is equivalent to B.Sc. in the new, Bologna-system)

**M. Sc. in Physics, 1996**

Kossuth Lajos University, Debrecen  
thesis: *Rényi entropy of the randomwalk on the squaregrid* (in Hungarian)  
(5-year University degree, it is equivalent to B.Sc.+M.Sc. in the new, Bologna-system)

## Appointments - Experience

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**2013-** Eastern Mediterranean University, Faculty of Arts and Sciences, Dept. of Mathematics  
*Faculty member*

**2010-2012** University of Debrecen, Faculty of Informatics  
*Vice-dean of the Faculty of Informatics*

**2009-2016** University of Debrecen, Faculty of Informatics, Dept. of Computer Science  
*Associate Professor*

**2007-2009** University of Debrecen, Faculty of Informatics, Dept. of Comp. Sci.  
*Assistant Professor*

**2003-2008** University of Rovira i Virgili, Tarragona, Spain, Research Group on Mathematical Linguistics  
*Researcher and Postdoctoral Researcher*

## Scientific Service

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### Conference organization

#### Organizing committee

- **NCMA 2016**, 8th International Workshop on Non-Classical Models of Automata and Applications, August 29-30, 2016, Debrecen, Hungary, co-chair
- **MCU'15**, 7th Conference on Machines, Computations and Universality, Famagusta, North Cyprus, organising committee co-chair ( <http://mcu2015.emu.edu.tr/mcu2015/> )
- **CiE 2014**, 10th Computability in Europe - Language, Life, Limits, Budapest, Hungary, organiser, committee member ( [http://www.ilc.uva.nl/CiE/index.php?page=22\\_8](http://www.ilc.uva.nl/CiE/index.php?page=22_8) ), CiE 2014 co-located workshop "New Computing Paradigms", organiser
- **AFL'11**, 13th International Conference on Automata and Formal Languages, 2011 Debrecen, Hungary, member of organising committee

Session chair in various conferences

#### Program committee (*selected, recent items*)

- **ICPR 2018**, 24th International Conference on Pattern Recognition, 20-24 August 2018, Beijing, China
- **IWCIA 2018**, International Workshop on Combinatorial Image Analysis, Nov 22-24, 2018, Porto, Portugal
- **MCU 2018**, 8th Conference on Machines, Computations and Universality, June 28-30, 2018, Fontainebleau, Paris region, France, PC member
- **ISPA 2017**, 10th International Symposium on Image and Signal Processing and Analysis, September 2017, Ljubljana, Slovenia, PC member
- **AFL 2017**, 15th International Conference on Automata and Formal Languages, September, 2017, Debrecen, Hungary, PC member
- **NCMA 2017**, 9th International Workshop on Non-Classical Models of Automata and Applications, Prague, Czech Republic, PC member
- **IWCIA 2017**, 18th International Workshop on Combinatorial Image Analysis, Plovdiv, Bulgaria, PC member
- Workshop on Discrete Geometry and Mathematical Morphology for Computer Vision In conjunction with ACCV 2016, Taipei, Taiwan, November 24, 2016, PC member
- **NCMA 2016**, 8th International Workshop on Non-Classical Models of Automata and Applications, August 29-30, 2016, Debrecen, Hungary, co-chair

- **MATCOS-2016**, Middle-European Conference on Applied Theoretical Computer Science (held in conjunction with the 19th Multi-Conference on Information Society, Ljubljana), Koper, Slovenia, October 2016, PC member
- **MCU'15**, 7th Conference on Machines, Computations and Universality, Famagusta, North Cyprus, conference **co-chair**
- **IWCIA 2015**, 17th International Workshop on Combinatorial Image Analysis, Indian Statistical Institute, Kolkata, India, program committee member
- **ISPA 2015**, 9th International Symposium on Image and Signal Processing and Analysis, Edinburgh, Scotland, UK, PC member
- **ICPR 2014**, International Conference on Pattern Recognition, Stockholm, Sweden, committee member
- **CiE 2014**, Computability in Europe 2014, program committee member
- **IWCIA 2014**, 16th International Workshop on Combinatorial Image Analysis, Brno, Czech Republic, PC member

Reviewer for various International journals and International Scientific Conferences

## Teaching

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### September 2013-present: Eastern Mediterranean University, Famagusta, North Cyprus (via Mersin-10, Turkey)

*Associate Professor*

teaching in undergraduate (all courses are in English)

- Discrete Mathematics
- Discrete Mathematics for Information Technology
- Mathematical Logic of Computers
- Fundamentals of Computer Science I-II
- Operating Systems
- Operating Systems and Their Applications
- Database Management Systems
- Algorithm Design and Analysis

teaching in graduate and PhD level (all courses are in English)

- Digital Geometry
- Theory of Algorithms
- Theory of Computing
- Combinatorics
- Graph Theory

## Publications

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### Co-editor:

Henning Bordihn, Benedek Nagy, György Vaszil: RAIRO - Theoretical Informatics and Applications (RAIRO: ITA), Special Issue: NON-CLASSICAL MODELS OF AUTOMATA AND APPLICATIONS VIII, 2018.

Jérôme Durand-Lose, Jarkko Kari, Benedek Nagy: Fundamenta Informaticae - Volume 155, issue 1-2 Special Issue on Machines, Computations and Universality (MCU 2015)

Henning Bordihn, Rudolf Freund, Benedek Nagy, György Vaszil: Eighth Workshop on Non-Classical Model of Automata and Applications, NCMA 2016, August 29th-30th, Debrecen, Hungary, books@ocg.at, Austrian Computer Society, BAND 321 (2016).

Henning Bordihn, Rudolf Freund, Benedek Nagy, György Vaszil: Eighth Workshop on Non-Classical Model of Automata and Applications, NCMA 2016, Short Papers, ISBN 978-3-200-04725-9.

Jérôme Durand-Lose, Benedek Nagy: Machines, Computations, and Universality - 7th International Conference, MCU 2015, Famagusta, North Cyprus, September 9-11, 2015, Proceedings. Lecture Notes in Computer Science 9288, Springer 2015, ISBN 978-3-319-23110-5

Author/co-author of more than 200 international journal and international conference papers.

#### Journal Papers (selected items from the last years, SCI and SCI-expanded papers)

- Tibor Lukić, Benedek Nagy: Regularized binary tomography on the hexagonal grid, *Physica Scripta* **94** (2019) 025201
- MohammadReza Saadat, Benedek Nagy: Cellular Automata Approach to Mathematical Morphology in the Triangular Grid, *Acta Polytechnica Hungarica (Journal of Applied Sciences)* **15/6** (2018), 45-62.
- Lidija Comic, Benedek Nagy: A Description of the Diamond Grid for Topological and Combinatorial Analysis, *Graphical Models* **100** (2018), 33-50.
- Mohsen Abdalla, Benedek Nagy: Dilation and Erosion on the Triangular Tessellation: An Independent Approach, *IEEE Access* **6** (2018), 23108-23119.
- Benedek Nagy: Generalised distances of sequences I: B-distances, *Miskolc Mathematical Notes* **19/1** (2018), 397-411.
- Benedek Nagy, Robin Strand, Nicolas Normand: Distance Functions Based on Multiple Types of Weighted Steps Combined with Neighborhood Sequences, *Journal of Mathematical Imaging and Vision* (Springer) **60** (2018), 1209-1219.
- Hamzeh Mujahed, Benedek Nagy: Hyper-Wiener index on rows of unit cells of the BCC grid, *Comptes rendus de l'Académie bulgare des Sciences* **71/5** (2018), 675-684.
- Hamzeh Mujahed, Benedek Nagy: Exact Formula for Computing the Hyper-Wiener Index on Rows of Unit Cells of the Face-Centred Cubic Lattice, *Analele Universitatii "Ovidius" Constanta - Seria Matematica (DE GRUYTER)*, **26/1** (2018), 169-187.
- Benedek Nagy: The Cheapest Way to Obtain Solution by Graph-Search Algorithms, *Acta Polytechnica Hungarica* **14/6** (2017), 29-40.
- Benedek Nagy, Sándor Vályi: A Shift-free Characterization of NP within Interval-valued Computing, *Fundam. Inform.* **155** (2017), 187-207.
- Gergely Kovács, Benedek Nagy, Béla Vizvári: Weighted Distances and Digital Disks on the Khalimsky Grid - Disks with Holes and Islands, *Journal of Mathematical Imaging and Vision* **59(1)**: 2-22 (2017)
- Benedek Nagy, Elisa Valentina Moisi: Memetic algorithms for reconstruction of binary images on triangular grids with 3 and 6 projections, *Applied Soft Computing* **52**, (2017), 549-565.
- Benedek Nagy: Application of neighborhood sequences in communication of hexagonal networks, *Discrete Applied Mathematics – DAM* **216** (2017), 424-440.
- L. Comic, B. Nagy: A combinatorial coordinate system for the body-centered cubic grid, *Graphical Models* **87** (2016), 11-22.
- L. Comic, B. Nagy: A topological coordinate system for the diamond cubic grid, *Acta Crystallographica, Section A: Foundations and Advances*, **A72/5** (2016), 570-581.
- B. Nagy, T. Lukic: Dense projection tomography on the triangular tiling, *Fundamenta Informaticae* **145** (2016), 125-141.
- L. Comic, B. Nagy: A topological 4-coordinate system for the face centered cubic grid, *Pattern Recognition Letters - PRL* **83** (2016), 67-74.
- László Hegedüs, Benedek Nagy: On periodic properties of circular words, *Discrete Mathematics* **339/3** (2016), 1189-1197.
- Hamzeh Mujahed, Benedek Nagy: Wiener index on rows of unit cells of the face-centred cubic lattice, *Acta Crystallographica, Section A: Foundations and Advances*, Volume **A72**, Part 2 (2016), 243-249.
- Raed Basbous, Benedek Nagy: Strategies to Fast Evaluation of Tree Networks, *Acta Polytechnica Hungarica* **12/6** (2015), 127-148.
- Benedek Nagy: Cellular topology and topological coordinate systems on the hexagonal and on the triangular grids, *Annals of Mathematics and Artificial Intelligence* (Springer) **75** (2015), 117-134.
- Tibor Lukic, Benedek Nagy: Deterministic discrete tomography reconstruction by energy minimization method on the triangular grid, *Pattern Recognition Letters* **49** (2014), 11-16.
- B. Nagy, F. Otto: Deterministic Pushdown-CD-Systems of Stateless Deterministic R(1)-Automata, *Acta Informatica* **50** (2013), 229-255.
- B. Nagy, K. Barcsi: Isoperimetrically Optimal Polygons in the Triangular Grid with Jordan-type Neighbourhood on the Boundary, *International Journal of Computer Mathematics* **90** (2013), 1629-1652.

- B. Nagy: On a hierarchy of  $5' \rightarrow 3'$  sensing Watson-Crick finite automata languages, *Journal of Logic and Computation* (Oxford University Press) **23** (2013), 855-872.
- B. Nagy, F. Otto: On Globally Deterministic CD-Systems of Stateless R-Automata with Window Size One, *International Journal of Computer Mathematics* **90** (2013), 1254-1277.
- L. Hegedüs, B. Nagy, Ö. Egocioglu: Stateless Multicounter  $5' \rightarrow 3'$  Watson-Crick Automata: The Deterministic Case, *Natural Computing* **11** (2012), 361-368.
- B. Nagy, F. Otto: On CD-systems of stateless deterministic R-automata with window size one, *Journal of Computer and System Sciences - JCSS* **78** (2012), 780-806.
- B. Nagy, S. Vályi: Prime factorization by interval-valued computing, *Publicationes Mathematicae Debrecen* **79/3-4** (2011), 539-551.
- B. Nagy, F. Otto: CD-Systems of Stateless Deterministic R(1)-Automata Governed by an External Pushdown Store, *RAIRO - Theoretical Informatics and Applications, RAIRO-ITA* **45** (2011), 413-448.
- Ö. Egecioglu, L. Hegedüs, B. Nagy: Hierarchies of Stateless Multicounter  $5' \rightarrow 3'$  Watson-Crick Automata Languages, *Fundamenta Informaticae - FI* **110** (2011), 111-123.
- R. Strand, B. Nagy, G. Borgefors, Digital Distance Functions on Three-Dimensional Grids, *Theoretical Computer Science - TCS* **412** (2011), 1350-1363.
- B. Nagy, R. Strand: Approximating Euclidean circles by neighbourhood sequences in a hexagonal grid, *Theoretical Computer Science - TCS* **412** (2011), 1364-1377.
- P. Leupold, B. Nagy:  $5' \rightarrow 3'$  Watson-Crick automata with several runs, *Fundamenta Informaticae* **104** (2010) 71-91.

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#### Referred Conference Articles (Selected items from the last years)

- Benedek Nagy, Tibor Lukic: Binary Tomography on Triangular Grid Involving Hexagonal Grid Approach, **IWCIA 2018, LNCS 11255** (2018), 68-81.
- Aydin Avkan, Benedek Nagy, Müge Saadetoglu: Digitized Rotations of Closest Neighborhood on the Triangular Grid, **IWCIA 2018, LNCS 11255** (2018), 53-67.
- Benedek Nagy, Sándor Vályi: An Extension of Interval-Valued Computing Equivalent to Red-Green Turing Machines, **MCU 2018: 8th International Conference on Machines, Computations, and Universality, LNCS 10881** (2018), 137-152.
- Shaghayegh Parchami, Benedek Nagy: Deterministic Sensing  $5' \rightarrow 3'$  Watson-Crick Automata Without Sensing Parameter, **UCNC 2018: 17th International Conference on Unconventional Computation and Natural Computation, LNCS 10867** (2018), 173-187.
- Gergely Kovács, Benedek Nagy, Béla Vizvári: Weighted Distances on the Trihexagonal Grid, **DGCI 2017, Discrete Geometry for Computer Imagery - 20th IAPR International Conference, LNCS 10502** (2017), 82-93.
- Gergely Kovács, Benedek Nagy, Béla Vizvári: An Integer Programming Approach to Characterize Digital Disks on the Triangular Grid, **DGCI 2017, Discrete Geometry for Computer Imagery - 20th IAPR International Conference, LNCS 10502** (2017), 94-106.
- Benedek Nagy, Shaghayegh Parchami, Hamid Mir-Mohammad-Sadeghi: A New Sensing  $5' \rightarrow 3'$  Watson-Crick Automata Concept, **AFL 2017, Proceedings 15th International Conference on Automata and Formal Languages, EPTCS 252** (2017), 195-204.
- Mohsen Abdalla, Benedek Nagy: Concepts of Binary Morphological Operations Dilation and Erosion on the Triangular Grid, Computational Modeling of Objects Presented in Images. Fundamentals, Methods, and Applications (**CompIMAGE 2016, International Symposium Computational Modeling of Objects Represented in Images**), **LNCS 10149** (2017), 89-104.
- Raed Basbous, Tibor Tajti, Benedek Nagy: Fast Evaluations in Product Logic: Various Pruning Techniques, **IEEE WCCI 2016 - IEEE World Congress on Computational Intelligence, FUZZ-IEEE 2016 - the 2016 IEEE International Conference on Fuzzy Systems, Vancouver, Canada, 140-147**.
- Benedek Nagy: Number of Words Characterizing Digital Balls on the Triangular Tiling, **DGCI 2016, LNCS 9647** (2016), 31-44.
- Raed Basbous, Benedek Nagy, Tibor Tajti: Short Circuit Evaluations in Gödel Type Logic, V. Ravi et al. (eds.), Proceedings of the Fifth International Conference on Fuzzy and Neuro Computing (**FANCCO - 2015, India**), Advances in Intelligent Systems and Computing - **AISC 415** (2015), 119-138. (Springer)

- Mousumi Dutt, Arindam Biswas, Benedek Nagy: Number of Shortest Paths in Triangular Grid for 1- and 2- Neighborhoods, **IWCIA'15**, Seventeenth International Workshop on Combinatorial Image Analysis, **LNCS 9448** (2015), 115-124.
- Lidija Comic and Benedek Nagy: A Combinatorial 4-Coordinate System for the Diamond Grid, 12th International Symposium on Mathematical Morphology, **ISMM 2015**, Reykjavik, Iceland, **LNCS 9082**, (2015) 585–596.
- Hamzeh Mujahed and Benedek Nagy: Wiener Index on Lines of Unit Cells of the Body-Centered Cubic Grid, 12th International Symposium on Mathematical Morphology, **ISMM 2015**, Reykjavik, Iceland, **LNCS 9082**, (2015) 597–606.
- Benedek Nagy, Elisa Valentina Moisi: Binary tomography on the triangular grid with 3 alternative directions - a genetic approach, **ICPR 2014**: 22nd International Conference on Pattern Recognition, Stockholm, Sweden, 1079-1084 (IEEE Computer Society).
- Gemma Bel Enguix, Benedek Nagy: Modeling Syntactic Complexity with P Systems: A Preview, **UCNC 2014**: Unconventional Computation and Natural Computation, Lecture Notes in Computer Science - **LNCS 8553** (2014), 54-66.
- Benedek Nagy: Graphical Representations of Context-Free Languages, **Diagrams 2014**: Diagrammatic Representation and Inference, Lecture Notes in Computer Science - **LNCS 8578** (2014), 48-50.
- Beáta Bojda, Katalin Bubnó, Benedek Nagy, Viktor Takács: A Graphical Representation of Boolean Logic, **Diagrams 2014**, **LNCS 8578** (2014), 228-230.
- Benedek Nagy: Weighted Distances on a Triangular Grid, **IWCIA 2014**: Combinatorial Image Analysis, Lecture Notes in Computer Science - **LNCS 8466** (2014), 37-50.
- László Hegedüs, Benedek Nagy: Representations of Circular Words. **AFL 2014**: Automata and Formal Languages, Szeged, Hungary, **EPTCS 151** (2014), 261-270.
- Benedek Nagy, Robin Strand, Nicolas Normand: A Weight Sequence Distance Function, **ISSM - 11th International Symposium on Mathematical Morphology**, **LNCS 7883** (2013), 292-301.
- B. Nagy, S. Vályi: Computing discrete logarithm by interval-valued paradigm, (Benedikt Loewe, Glynn Winskel, eds.), Proceedings 8th Workshop on Developments in Computational Models - **DCM 2012**, Cambridge, England, Electronic Proceedings in Theoretical Computer Science - **EPTCS 143** (2014), 76-86.
- B. Nagy, On Efficient Algorithms for SAT, **CMC 2012**, **LNCS 7762** (2013), 295-310.
- V. Halász, L. Hegedüs, I. Hornyák, B. Nagy: Solving application oriented graph theoretical problems with DNA computing, (J. C. Bansal et al., eds.), Proceedings of Seventh International Conference on Bio-Inspired Computing: Theories and Applications (**BIC-TA 2012**), Advances in Intelligent Systems and Computing (**AISC**, Springer) **201**, 75-85.
- B. Nagy, Cellular Topology on the Triangular Grid, **IWCIA 2012**, Lecture Notes in Computer Science - **LNCS 7655**, (2012), 143–153.
- G. Jiraskova, B. Nagy: On Union-Free and Deterministic Union-Free Languages, International Federation for Information Processing - Theoretical Computer Science 2012, **IFIP-TCS 2012**, **LNCS 7604** (2012), 179–192, 2012.
- B. Nagy, F. Otto: Globally deterministic CD-systems of stateless R(1)-automata, **LATA 2011**, **LNCS 6638** (2011), 390-401
- B. Nagy, K. Barczy: Isoperimetrically optimal Polygons in the Triangular Grid, **IWCIA 2011**, **LNCS 6636** (2011), 194-207.
- B. Nagy, F. Otto: An automata-theoretical characterization of context-free trace languages, **SOFSEM 2011**, Lecture Notes In Computer Science - **LNCS 6543** (2011), 406–417.
- B. Nagy, An automata-theoretic characterization of the Chomsky-hierarchy, **TAMC 2010**, Lecture Notes in Computer Science - **LNCS 6108** (2010), 361-372.
- B. Nagy, F. Otto: CD-Systems of Stateless Deterministic R(1)-Automata Accept all Rational Trace Languages, **LATA 2010**, Lecture Notes in Computer Science - **LNCS 6031** (2010), 463-474. Springer, Heidelberg

**Over 100 conference/workshop presentations and 25 research seminars/invited talks in various universities.**