

NATAŠA JONOSKA

Curriculum Vitae

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Department of Mathematics and Statistics
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EDUCATION:

- **PhD** June 1, 1993
Department of Mathematical Sciences, SUNY at Binghamton
Dissertation Adviser: Tom Head
Title: Synchronizing Representations of Sofic Systems
- Fall 1988 - Spring 1993
Graduate course work at SUNY Binghamton
- Spring 1985 - Spring 1987
Graduate course work at University of Belgrade, Serbia (formerly Yugoslavia).
- Fall 1980 - Fall 1984 :
B.S. in Mathematics and Computer Science
University 'Cyril and Methodius' - Skopje
Skopje, Macedonia (formerly Yugoslavia). Graduation: October 31, 1984.
Graduation thesis: The Word Problem in Groups

POSITIONS HELD:

- Fall 2006 – present : *Professor*, University of South Florida, Tampa Florida.
- June 2015 – December 2015: *Blaise Pascal Professor*, Leiden University, the Netherlands.
- Summer 2009: *Visiting Research Professor* Université Pierre et Marie Curie, Paris, France.
- Jan - June 2008: *Visiting Researcher*, University of Milano - Bicocca, Milano, Italy.
- Fall 1998 - Spring 2006 : *Associate Professor*, University of South Florida, Tampa Florida.
- Summer 2003 : *Visiting Researcher*, University of Metz, Metz, France.
- Fall 2001 : *Visiting Scholar*, New York University, NY.
- Spring 2001 : *Van Vleck Visiting Associate Professor*, Wesleyan University, Middletown CT.
- Fall 1993 - Spring 1998 : *Assistant Professor*, University of South Florida, Tampa Florida.
- January 1993 - August 1993 : *Research Assistant*, SUNY-Binghamton, supported by the NSF grant CCR-9201345
- Summer 1989, Summer 1990 - Fall 1992 : *Teaching Assistant*, Dept. of Math. Sciences, SUNY-Binghamton
- Fall 1988 - Spring 1990 : *Graduate Assistant*, Dept. Math. Sciences, SUNY-Binghamton,
- April 1985 - June 1988 : *Full time employment as assistant/instructor*, Faculty of Natural and Mathematical Sciences, University 'Cyril and Methodius'-Skopje (Macedonia),

GRANTS, AWARDS AND MEMBERSHIPS:

USF Outstanding Research Achievement Award 2015

2015 Blaise Pascal Professor, University of Leiden, the Netherlands

AAAS Fellow since 2014

2007 Rozenberg Tulip Award in DNA Computing and Molecular Programming awarded by ISNSCE (International Society for Nanoscale Science Computing and Engineering)

USF Presidential Excellence Award, USF 2003.

Best graduating student of the year 1984; Faculty of Natural and Mathematical Sciences at the University 'Cyril and Methodius' - Skopje.

Grant awards (since 2010), continuous NSF funding since 2000

- NSF CCF 1620729: DNA Computing and Molecular programming, **PI** \$25,500, 2/15/16 – 1/31/18.
- NSF CCF 1526485; AF: Small: Collaborative Research: Programmed Cyclic Molecular Dancing on 2D Origami Lattices **PI** , Collaborative with N. C. Seeman at NYU total award \$450,000 (USF portion \$200,000) 8/1/15–7/31/18.
- NIH- R01 GM109459 RNA-guided Genome Rearrangement: Experiments Coupled with Discrete Models, **PI** (co-PIs: M. Saito, USF and L.F. Landweber, Columbia University) Total budget \$2,000,000. 9/1/13–8/31/18.
- NSF-REU CCF-1117254-001 Research Experience for Undergraduates (**PI**) 5/13-8/15 \$10,000.
- London Math Society (LMS Scheme 2 grant) travel grant 3/12–8/12, \$2,300. (UK 2,000)
- NSF DMS-1157242: Workshop on Discrete and Topological Models in Molecular Biology (**PI**, M. Saito co-PI) \$29,072, 3/12 - 2/13.
- NSF CCF-1117254: Collaborative Research: Active DNA Assembly of Aperiodic Structures (**PI**) \$199,695, 08/11 - 07/15. (Collaborative research with N.C. Seeman, NYU, total award \$445,000)
- USF Sponsored Research : Workshop on Discrete and Topological Models in Molecular Biology, \$10,000, (**PI, M. Saito co-PI**) 06/11 - 12/12.
- NSF - Computability in Europe (**co-PI**, Douglas Cenzer, University of Florida, **PI**) - conference support \$20,000.
- NSF/NIH DMS-0900671: RNA guided DNA recombination through assembly graphs (**PI**, M. Saito co-PI) - 9/09 - 8/14. (Collaborative research with L. Landweber, Princeton University) total award \$1,400,000.

Memberships:

- International Society for Nanoscale Science Computing and Engineering, founding officer, (2004 –)
- American Association for Advancement in Science, January (1997 –)

- Society for Mathematical Biology, (2016 –)
- Society for Industrial and Applied Mathematics, (2015–)
- European Association of Theoretical Computer Science, (1994 –)
- Association for Women in Mathematics, (1992 –)

PROFESSIONAL ACTIVITIES AND SERVICE

Current Appointments

- Editorial Board: *Natural Computing* (associate editor) Springer - Verlag
- Editorial Board: *Theoretical Computer Science – C* Elsevier Science
- Editorial Board: *International Journal of Foundations of Computer Science* World Scientific
- Editorial Board: *Computability* IOS - Press
- Editorial Board: *Molecular Based Mathematical Biology* DE Gruyter
- Advisory panel member for the Springer book series *Theory and Application of Computability*.
- **Co-organizer** *Topological Methods in Brain Network Analysis*, Banff BIRS May 7–12, 2017.
- **Chair** of the Steering Committee (2008 –) for DNA Based Computers and Molecular Programming meetings. (Member since 2006)
- **Co-chair** of the Steering Committee for the Unconventional Computing and Natural Computing (2012 -)
- Member of the Steering Committee for Developments in Language Theory (2010 -)
- Member of the Steering Committee for Computability in Europe (2011 -)
- Member of the Steering Committee for Machines, Computations and Universality (2012 –)
- PC member for: DNA23 (September 2017, Austin, TX), UCNC'17 (June 2017, Fayetteville AK), CiE 2017 (June 2017, Turku, Finland)
- Co-organizer of AMS special Session *Mathematics of Biomolecules: Discrete, Algebraic, and Topological* Orlando, FL , September 23–24, 2017.

BOOKS:

- A. Beckmann, L. Bienvenu, N. Jonoska, (ads) *Pursuit of the Universal* 12th conference on Computability in Europe, CiE 2016, Paris France June 27 – July 1, 2016. LNCS **9709**, Springer 2016.
- N. Jonoska, M. Saito, (eds) *Discrete and Topological Models in Molecular Biology* Springer-Verlag 2014.

- J. Durand-Lose, N. Jonoska, (eds) *Unconventional Computation and Natural Computation* 11th International Conference, UCNC 2012 Orleans, France, September 3-7, 2012, LNCS **7445** Springer, 2012.
- J. Chen, N. Jonoska, G. Rozenberg, (eds) *Nanotechnology: Science and Computing*, Springer - Verlag 2006.
- N. Jonoska, Gh. Paun, G. Rozenberg, (eds.) *Aspects of Molecular Computing* LNCS **2950** Springer-Verlag 2004.
- N. Jonoska, N.C. Seeman, (eds.) *DNA Computing*, Revised papers from the 7th International Meeting on DNA Based Computers, LNCS **2340** Springer-Verlag 2002.
- N. Jonoska, *Molecular Information Processing: From Formal Models to Experimental Implementation* (in preparation) contract signed with Springer-Verlag.

RESEARCH PAPERS: (Mentored students and postdocs indicated with *)

- J. Braun*, D. Cruz*, N. Jonoska, *Platform color designs for interactive molecular arrangements* Unconventional Computing and Natural Computing (M. Patitz, M. Stanett, eds.) (2017) (to appear)
- D. Genova, H.J. Hoogeboom, N. Jonoska, *A graph isomorphism condition and equivalence of reaction systems* Theoretical Computer Science (2017) (to appear)
- N. Jonoska, M. Krajčevski, G. McColm, *Traversal Languages Capturing Isomorphism Classes on Sierpiński Gaskets* Unconventional Computing and Natural Computing (M. Amos, A. Condon, eds.) LNCS 9726 (2016) 155–167.
- J. Burns*, D. Kukushkin*, X. Chen, L.F. Landweber, M. Saito, N. Jonoska, *Recurring patterns among scrambled genes in the encrypted genome of the ciliate *Oxytricha trifallax**, Journal of Theoretical Biology (2016), pp. 171-180, <http://dx.doi.org/10.1016/j.jtbi.2016.08.038>.
- J. Burns*, D. Kukushkin*, K. Lindblad, X. Chen, N. Jonoska, L.F. Landweber *(mds ies db): A database of ciliate genome rearrangements* Nucleic Acids Research 44:D1 (2016), D703-D709.
- D. Buck, E. Dolzenko*, N. Jonoska, M. Saito, K. Valencia, *Genus Ranges of 4-Regular Rigid Vertex Graphs*, Electronic Journal of Combinatorics, 22(3) (2015), #P3.43.
- N. Jonoska, M. Krajčevski, G. McColm, *Counter Machines and Crystallographic Structures* Natural Computing Volume 15, Issue 1 (2016) 97-113 DOI 10.1007/s11047-015-9527-0
- N. Jonoska, N.C. Seeman, *Molecular Ping Pong Game of Life on a 2D Origami Array* Philosophical Transactions of the Royal Society - A. (Vol. 373, issue 2046) 15 June 2015.DOI: 10.1098/rsta.2014.0215
- N. Jonoska, D. Karpenko*, S. Seki*, *Dynamic Simulation of 1D Cellular Automata in the Active aTAM*, New Generation Computing, 33 (2015) 271-295.
- J. Burns*, N. Jonoska, M. Saito, *Genus Ranges of Chord Diagrams*, Journal of Knot Theory and Ramifications, Vol. 24 (2015) 1550022 (15 pages)

- J. E. Padilla*, R. Sha, M. Kristiansen, J. Chen, N. Jonoska, N.C. Seeman *A Signal-Passing DNA Strand Exchange Mechanism for the Active Self-Assembly of DNA Nanostructures* *Angewandte Chemie* (2015) 11;54(20):5939-42. doi: 10.1002/anie.201500252
- P. Bonizzoni, N. Jonoska. *Existence of Constants in Regular Splicing Languages*, *Information and Computation*, Volume 242 (2015) 340–353, DOI:10.1016/j.ic.2015.04.001.
- N. Jonoska, M. Krajčevski, G. McColm, *Languages Associated with Crystallographic Symmetry* *Unconventional Computing and Natural Computing* (O. Ibarra et al. eds) LNCS 8553 (2014) 216–228 (best paper award), 10.1007/978-3-319-08123-6_18.
- N. Jonoska, F. Manea, S. Seki* *A Stronger Square Conjecture on Binary Words* in SOFSEM 2014 (V. Geffert, B. Preneel, B. Rován, J. Stuller and A. M. Tjoa eds) LNCS **8327** (2014) 339–351. 10.1007/978-3-319-04298-5_30
- N. Jonoska, D. Karpenko*, *Active Tile Self-Assembly, Part 1: Universality at Temperature 1* *International Journal of Foundation of Computer Science* Vol. 25 Issue 2 (2014) 141–163. (DOI: 10.1142/S0129054114500087)
- N. Jonoska, D. Karpenko*, *Active Tile Self-Assembly, Part 2: Recursion and Self-similarity* *International Journal of Foundation of Computer Science* Vol. 25 Issue 2 (2014) 165–194. (DOI: 10.1142/S0129054114500099)
- T. Ratner*, R. Piran, N. Jonoska, E. Keinan, *Biologically Relevant Molecular Transducer with Increased Computing Power and Iterative Abilities* *Chemistry & Biology*, Cell Press Vol. 20, Issue 5 (2013) 726–733. doi:10.1016/j.chembiol.2013.02.016
- J. Burns*, E. Dolzhenko*, N. Jonoska, T. Muche*, M. Saito, *Four-regular Graphs with Rigid Vertices Associated to DNA Recombination* *Discrete and Applied Math* online published Feb. 13, 2013 (DOI: 10.1016/j.dam.2013.01.003) Vol.161, Issues 10-11 (2013) 1378–1394.
- A. Angeleska*, N. Jonoska, M. Saito, *Rewriting rule chains modeling DNA rearrangement pathways*, *Theoretical Computer Science* **454** (2012) 5–22
online: <http://dx.doi.org/10.1016/j.tcs.2012.04.041>.
- N. Jonoska, N.C. Seeman, *Computing by molecular self-assembly*, *Interface Focus* 2 (2012) 504511 online published doi:10.1098/rsfs.2011.0117
- D. Genova*, N. Jonoska, *Forbidding and enforcing conditions on Graphs*, *Theoretical Computer Science* **429** (2012) 108 –117. DOI: 10.1016/j.tcs.2011.12.029
- B. Chakraborty*, N. Jonoska, N. C. Seeman, *A Programmable Transducer Self-Assembled from DNA*, *Chemical Science, The Royal Society of Chemistry* **3** (2012) p. 168, DOI: 10.1039/c1sc00523e.
- E. Dolzhenko*, N. Jonoska, *Two-dimensional languages and cellular automata*, *International Journal of Foundations of Computer Science*, **23-1** (2012) 185–206. DOI: 10.1142/S0129054112500037
- P. Bonizzoni, N. Jonoska, *Regular splicing languages must have a constant*, *Developments in Language Theory* (G. Mauri and A. Leporati, Eds.) DLT 2011, LNCS **6795**(2011) 82–92.
- N. Jonoska, M. Saito, *DNA rearrangements through spatial graphs*, *Computability in Europe* (F. Ferreira et al. eds.) LNCS **6158** (2010) 211–218.

- N. Jonoska, J. Pirnot*, Finite state automata representing two-dimensional subshifts, *Theoretical Computer Science* **410**:37 (2009) 3504–3512.
- N. Jonoska, G. McColm, A. Staninska*, On Stoichiometry for the assembly of flexible-tile DNA complexes, *Natural Computing* **10** (2011) 1121–1141 (online: DOI: 10.1007/s11047-009-9169-1).
- G. Wu*, N. Jonoska, N.C. Seeman, Construction of a DNA nano-object directly demonstrates computation, *BioSystems* **98** (2009) 80–84: doi:10.1016/j.biosystems.2009.07.004.
- C. Liu, N. Jonoska, N. C. Seeman, Reciprocal DNA nanomechanical devices controlled by the same set strands, *Nano Letters* **Vol. 9** No. 7 (2009) 2641–2647.
- E. Dolzhenko*, N. Jonoska, N.C. Seeman, Transducer generated arrays of robotic nano-arms *Natural Computing*.**9** (2010) 437–455 online: DOI 10.1007/s11047-009-9157-5
- A. Angeleska*, N. Jonoska. M. Saito, DNA Rearrangement through assembly graphs *Discrete and Applied Math*, **157** (2009) 3020–3037.
(available online <http://dx.doi.org/10.1016/j.dam.2009.06.011>) .
- R. Brijder, M. Daley, T. Harju, N. Jonoska, I. Petre, and Gr. Rozenberg, *The computational nature of gene assembly in ciliates* chapter in Handbook of natural computing Vol. 3 (G. Rozenberg, T. Bäck, J.N. Kok eds) Springer (2012) 1233–1281.
- M. Anselmo, N. Jonoska, M. Madonia, *Framed versus Unframed Two Dimensional Languages*, SOFSEM 09 (M. Nielsen et al. eds) LNCS **5404** (2009) 79–92.
- N. Jonoska, G. Wu*, N.C. Seeman, *Existence of single-stranded reporters in DNA-based graph structures* Theoretical Computer Science **410** 15 (2009) 1448–1460 also available online: <http://dx.doi.org/10.1016/j.tcs.2008.12.004>
- E. Dolzhenko*, N. Jonoska, *On complexity of two dimensional languages generated by transducers* in Implementation and Application of Automata (O. Ibaraa et al eds.) Springer LNCS **5148** (2008) 181 –190.
- N. Jonoska, G. McColm, *Complexity classes for self-assembling flexible tiles* Theoretical Computer Science **410** 4-5 (2009) 332–346.
- N. Jonoska, L. Kari, K. Mahalingam*, Involution join and solid codes, *Fundamenta Informaticae* **86** 1–2 (2008) 127–142.
- N. Jonoska, R. Twarock, *Blueprints for dodecahedral DNA cages*, J. of Physics A: Mathematical and Theoretical **41** (2008) 304043 (14pp) .
- N. Jonoska, A. Taormina, R. Twarock, *DNA cages with icosahedral symmetry in bionanotechnology* to appear in Algorithmic Bioprocesses (Condon, A.; Harel, D.; Kok, J.N.; Salomaa, A.; Winfree, E. , eds.) June 2009, p. 141–158.
- A. Angeleska*, N. Jonoska, M. Saito, L. Landweber, Strategies for RNA-Guided DNA Recombination, in Algorithmic Bioprocesses (Condon, A.; Harel, D.; Kok, J.N.; Salomaa, A.; Winfree, E. , eds.) June 2009 p. 83–98.

- N. Jonoska, Biomolecular Automata in *NanoBioTechnology, Bioinspired Devices and Materials of the Future*, Chapter 11, (S. Oded, I. Levi eds.) Humana Press 2008 p. 267–302.
- N. Jonoska, G. McColm, *Describing Self-assembly of Nanostructures*, SOFSEM (V. Geffert et al eds.) Springer LNCS **4910** (2008) 66–73.
- A. Angeleska*, N. Jonoska, M. Saito, L. Landweber, RNA-Guided DNA Assembly, *Journal of Theoretical Biology* **248** 4 (2007) 706–720.
- N. Jonoska, J. Pirnot*, Finite State Automata Representing Two-dimensional Subshifts, CIAA 2007 (J. Holub, J. Žd’árek eds.) Springer LNCS **4783** (2007) 277–289.
- M. Cavaliere*, N. Jonoska, P. Leupold, *DNA Splicing: Computing by Observing* Natural Computing **8** 1 (2009) 157–170. (published online first DOI:10.1007/s11047-007-9062-8)
- D. Genova*, N. Jonoska, *Defining Structures through Forbidding and Enforcing Constraints* Phisica B **394**, Issue 2, 15 May 2007, 306–310.
- G. Franco*, N. Jonoska, A. Plass, B. Osborn *Knee Joint Injury and Repair Modeled by Membrane Systems* BioSystems **91** 3 (2008) 473-488.
- N. Jonoska, G. McColm, *Flexible versus Rigid Tiles*, Unconventional Computers (Gh. Paun et al. eds.) Springer LNCS **4135** (2006) 139–151.
- N. Jonoska, L. Kari, K. Mahalingam*, *Involution Solid and Join Codes*, Developments in Language Theory, (O.H. Ibarra, Z. Dang eds.) Springer LNCS **4036** (2006) 192-202.
- N. Jonoska, *Biomolecular Automata* Bulletin of EATCS **88** (2006) 141– 166.
- D. Genova*, N. Jonoska, *Topological properties of forbidding-enforcing systems*, Journal of Automata Languages and Combinatorics **11** 4 (2006) 375–397.
- M. Cavaliere*, N. Jonoska, P. Leupold, *Recognizing DNA Splicing* in DNA Computing (DNA11), (A. Carbone N.A. Pierce, eds.) Springer LNCS **3892** (2006) 12–26.
- G. Franco*, N. Jonoska, *Forbidding-Enforcing Conditions in DNA Self-Assembly of Graphs*, in *Nanotechnology: science and computing* (J. Chen, et. al. eds.) Springer-Verlag (2006) 105 – 118.
- N. Jonoska, G. McColm, A. Staninska*, *Expectation and Variance of Self-Assembled Graph Structures* Proceedings of the 11th meeting of DNA based computers, in DNA Computing (DNA11), (A. Carbone N.A. Pierce, eds.) Springer LNCS **3892** (2006) 144–157.
- N. Jonoska, G. McColm, A. Staninska*, *Spectrum of a pot for DNA complexes* in DNA Computing 12 (C. Mao, T. Yokomori eds.) Springer LNCS **4287** (2006) 83–94.
- N. Jonoska, J. Pirnot*, *Transitivity in two-dimensional local languages defined by dot systems*, Int. J. of Foundations of Computer Science, **17**(2) (2006) 435 – 463.
- R. Sha, X. Zhang, S. Liao, P.E. Constantinou, B. Ding, T. Wang, A.V. Garibotti, H. Zhong, L.B. Israel, X. Wang, G. Wu, B. Chakraborty, J. Chen, Y. Zhang, H. Yan, Z. Shen, W. Shen, P. Sa-Ardyen, J. Kopatsch, J. Zheng, P.S. Lukeman, W.B. Sherman, C. Mao, N. Jonoska. N.C. Seeman, *Structural DNA Nanotechnology: Molecular Construction and Computation*, in Unconventional Computing 2005 (C. Calude et al. eds.) Lecture Notes in Computer Science **3699** (2005) 20–31.

- L. Colson, N. Jonoska, M. Margenstern, *λP Systems and Typed Λ -calculus*, (invited paper) (G. Mauri et al. eds.) Springer LNCS **3365** (2005) 1–18.
- N. Jonoska, G. McColm, *A Computational Model for Self-assembling Flexible Tiles* (C.S. Calude et. al. eds.) LNCS **3699** (2005) 142–156.
- M. Cavaliere*, N. Jonoska, S. Yogev, R. Piran, E. Keinan, N.C. Seeman *Biomolecular Implementation of Computing Devices with Unbounded Memory* (G. Ferretti, et. al. eds.) Springer LNCS **3384** (2005) 35–49.
- N. Jonoska, K. Mahalingam*, J. Chen, *Involution Codes; With Application to DNA Coded Languages* Natural Computing **4** (2) (2005) 141–162.
- N. Jonoska, M. Saito, *Algebraic and topological models for DNA recombinant processes* (invited paper) (C.S. Calude, E. Calude, M.J. Dinneen eds.) Springer LNCS **3340** (2004) 49–62.
- P. Sa-Ardyen*, N. Jonoska, N.C. Seeman, *Self-assembly of graphs represented by DNA Helix Axis Topology*, *J. Am. Chem. Soc.* **126**(21) (2004) 6648–6657.
- N. Jonoska, M. Margenstern, *Tree operations in P systems and Λ -calculus*, *Fundamenta Informaticae*, Vol. **59** 1 (2004) 67–90.
- N. Jonoska, S. Liao, N.C. Seeman, *Transducers with Programmable Input by DNA Self-assembly in Aspects of Molecular Computing* (N. Jonoska, Gh. Paun, G. Rozenberg eds.) LNCS **2950** (2004) 219–240.
- N. Jonoska, K. Mahalingam*, *Methods for Constructing Coded DNA Languages in Aspects of Molecular Computing* (N. Jonoska, Gh. Paun, G. Rozenberg eds.) LNCS **2950** (2004) 241–253.
- R. Ceterchi, R. Gramatovici, N. Jonoska, *Tiling Rectangular Pictures with P Systems Membrane Computing* International Workshop, WMC 2003 Tarragona, Spain, Revised Papers (C. Martin-Vide, G. Mauri, G. Păun, G. Rozenberg, A. Salomaa, Eds.) Springer-Verlag LNCS **2933** (2004) 88–103.
- R. Ceterchi, R. Gramatovici, N. Jonoska, K.G. Subramanian, *Tissue-like P Systems for Picture Generation*, *Fundamenta Informaticae*, **56** (2003), 311–328.
- N. Jonoska *Trends in computing with DNA* (survey article) *Journal of Computer Science and Technology* **19** 1 (2004) 98–113.
- N. Jonoska, K. Mahalingam*, *Languages of DNA based code words DNA Computing* (J. Chen, J. Reif, eds.) LNCS **2943** (2004) 61–73.
- M. Cavaliere*, N. Jonoska, *Forbidding and enforcing in membrane computing* Natural Computing **2** (2003) 215–228.
- E. Coven, A. Johnson, N. Jonoska, K. Madden, *The symbolic dynamics of multidimensional tiling systems*, *Ergodic Theory and Dynamical Systems* **23** (2003), 1–14.
- N. Jonoska, D. Kephart*, K. Mahalingam*, *Generating codes for DNA computing*, *Congressus Numerantium* **156** (2002) 99–110. (Also published in the book of late breaking papers GECCO'02.)

- N. Jonoska, P. Sa-Ardylen*, N.C. Seeman, *Computation by self-assembly of DNA graphs*, Journal of Genetic Programming And Evolvable Machines **4** (2003) 123–137.
- P. Sa-Ardylen*, N. Jonoska, N.C. Seeman, *Self-assembling DNA graphs*, Revised papers of 8th International Meeting on DNA based computers (eds. M. Hagiya, A. Ohuchi) Springer LNCS vol. **2568** (2002), 1–9. *also in a journal*: Natural Computing **2** 4 (2003) 427–438.
- E. Coven, N. Jonoska, *DNA Hybridization, Shifts of Finite type and Tiling of the Integers, Grammars and Automata for String Processing: From Mathematics and Computer Science to Biology, and Back*. (C. Martin-Vide, V. Mitrana, eds.) Taylor and Francis, London, (2003) 369–380.
- N. Jonoska, M. Saito, *Boundary Components of Thickened Graphs*, Revised papers of 7th International Meeting on DNA based computers (eds. N. Jonoska, N.C. Seeman) Springer LNCS vol. **2340** (2002) 70–81.
- D. Fiebig, U. Fiebig, N. Jonoska, *Multiplicities of SFT Covers*, Theoretical Computer Science, **262** (2001) 349–375.
- N. Jonoska, S. Karl, M. Saito: *Three dimensional DNA structures in computing BioSystems*, **52** (1999) 143–153.
- M. Garzon, N. Jonoska, S.A. Karl: *Bounded Complexity of DNA Computing BioSystems*, **52** (1999) 63–72.
- N. Jonoska, *3D DNA patterns and Computing* (invited paper) (A. Carbone, M. Gromov, P. Pruzinkiewicz editors) World Scientific Publishing Company, Singapore, (1999) 310–324.
- N. Jonoska, S. Karl, M. Saito, *Creating 3-Dimensional Graph Structures With DNA in DNA based computer III* (Editors: H. Rubin, D. Wood) DIMACS series in Discrete Math. and Theoretical Comp. Sci. vol **48** (1999) 123–136.
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- N. Jonoska, S. Karl, *Ligation Experiments in Computing with DNA*, *Proceedings of 1997 IEEE International Conference on Evolutionary Computation (ICEC'97)*, April 13-16, (1997) 261–265.
- C. Mitrovski, Lj. Kocarev, N. Jonoska, *On a class of n-th order digital filters operating outside the region of stability*, *Int. Journal of Circuit Theory and Appl*, **26** #2 (1998) 199–205.
- N. Jonoska, S. Karl, *A molecular computation of the road coloring problem in DNA based computer II* (Editors: L. Landwaber, E. Baum) DIMACS series in Discrete Math. and Theoretical Comp. Sci. **44** (1999) 87 – 96,
- N. Jonoska, *Constants in factorial and prolongable languages*, *Pure Math. Appl.* **7** 1-2 (1996), 99–110.
- N. Jonoska, *A conjugacy invariant for reducible sofic shifts and its semigroup characterizations* *Israel Journal of Mathematics* **106** (1998) 221–249.

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- N. Jonoska, T. Head, *Images of Cellular Maps on Sofic Shifts*, Congressus Numerantium, **101** (1994) 109–115.
- N. Jonoska, B. Marcus, *Minimal Presentations of Irreducible Sofic Shifts*, IEEE Transactions on Information Theory, **40** No.6 (1994) 1818–1825.
- N. Jonoska, *Spinal Cellular Automata*, IEEE proceedings of the International Conference on Computing and Information 1992 (ICCI'92) (1993) 18–21.
- Z. Mitreska, Lj. Janićijević, B. Veljanovski, N. Jonoska, *Hermite-Gaussian beam transformation by thin hologram grating*, Optik **88** No.1 (1991) 1–6.

TECHNICAL REPORTS

- R. Ceterchi, R. Gramatovici, N. Jonoska, K.G. Subramanian, Generating Picture Languages with P systems, *Technical Report 26/03*, Rovira i Virgili University, (M. Cavaliere, C. Martín-Vide, Gh. Păun, eds.), *Brainstorming Week on Membrane Computing*, Tarragona, 2003, 85–100.
- M. Cavaliere, N. Jonoska, Forbidding and Enforcing in Membrane Computing, Rovira i Virgili Univ., Tech. Rep. No. 26, (M. Cavaliere, C. Martín-Vide, Gh. Paun, Eds.), *Brainstorming Week on Membrane Computing*; Tarragona, Feb 5-11 2003, 75-84.
- N. Jonoska, *Computing with Biomolecules: Trends and Challenges*, Technical report 27/03, University 'Rovira i Virgili', Tarragona, Spain, 2003.

RESEARCH ARTICLES SUBMITTED OR IN PREPARATION:

- N. Jonoska, L. Nabergall, M. Saito, Patterns in words, in preparation.
- J. Braun, L. Nabergall, R. Neme, L. F. Landweber, M. Saito, N. Jonoska, *Complex nested and scrambled rearrangements in the genome of *Oxytricha trifallax**, in preparation.
- M. Hajij, N. Jonoska, D. Kukushkin, M. Saito, *Graph Based Analysis for Gene Segment Interactions In a Scrambled Genome*, in preparation.
- G. Franco, N. Jonoska, The power of a single membrane, manuscript.
- *Observing Splicing* (with M. Cavaliere) manuscript.

OTHER SCHOLARLY PUBLICATIONS:

- G. Hart, N. Jonoska *Knotting Mathematics and Art* (review of the International Conference on Low Dimensional Topology and Mathematical Art), Journal of Mathematical Art **2** 1 (2008) 47–51.
- *Computing with Biomolecules* Quaternion Mathematics Department USF, Fall 2001.

- N. Jonoska, *Computing with Biomolecules* (invited paper), *Theorietag 2000: New Computing Paradigms: Molecular Computing and Quantum Computing* (R. Freund editor) University of Technology Vienna, (2000) 35-58.

CONFERENCES AND INVITATIONS (since 2010):

Short course invitations (series of lectures)

- *Math models for DNA self-assembly* IIT Chennai, India, December 2017.
- *Computing models in, and inspired by, biological systems* Department of Computer Science, University of Verona, Verona, Italy, December 8–18, 2016.
- *Mathematical models for DNA recombination processes* short course Department of Mathematical Sciences, Durham University, Durham UK, June 2–7, 2012.

Invited (plenary) one hour lectures, with supported travel, since 2010:

- Topology of the biomolecular world, AIM workshop in San Jose, CA, July 24–28, 2017.
- *Using spacial graphs to study DNA recombination*, Politecnico University, Milano, Italy, Dec. 11, 2016.
- *Detecting reoccurring patterns of scrambled genes*, University of Verona, Italy, Dec. 12, 2016.
- *Algorithmic self-assembly and self-similar structures* ICERM workshop: Stochastic Topology and Thermodynamic Limits, Brown University, October 17–21, 2016.
- *Topological graph theory in DNA self-assembly and DNA recombination*, MBI workshop: Topological, Geometric, and Statistical Techniques in Biological Data Analysis, September 12–16, 2016.
- *RNA-guided DNA recombination Through Spatial Graphs*, NIMBioS Investigative workshop: Algebraic Mathematical Biology, July 25–27, 2016
- *Graph Polynomials from DNA Rearrangements* Dagstuhl Seminars: Graph Polynomials: Towards a Comparative Theory, Schloss Dagstuhl, Leibniz-Zentrum für Informatik, Germany, June 12–17, 2016.
- *Computation by Molecular Self-assembly* Florida Polytechnic, FL-MAA sectional meeting, Dec. 4, 2015.
- *Self-similarity and recursion in algorithmic DNA self-assembly*, (colloquium) Abo University in Turku, Finland, November 5, 2015.
- *Computation by molecular self-assembly* Pascal Professor public lecture, University of Leiden, Leiden, The Netherlands, October 27th, 2015.
- *RNA-guided DNA Recombination Through Spatial Graphs*, (colloquium) University of Milano – Bicocca, Milano, Italy, October 15th, 2015.
- *Spatial rigid vertex graphs and RNA-guided DNA rearrangements*, MBI Workshop 1: Geometric and Topological Modeling of Biomolecules, Math Biology Institute, Ohio State University, Columbus, OH, Sept. 28–Oct.2, 2015.
- *Self-similarity and recursion in algorithmic self-assembly* European Commission, Brussels, November 6th, 2014.
- *RNA-guided DNA recombination Through Spatial Graphs* Mathematical Oncology at Moffitt Cancer Research Center, November 13, 2014.

- *DNA Recombination through spatial graphs* AMS Special Session on Applications of Knot Theory to the Entanglement of Biopolymers, October 25–36, 2014.
- *Self-similarity and recursion in algorithmic DNA self-assembly* Heterotic computing: exploiting hybrid computational devices 07 – 08 November 2013, The Royal Society at Chicheley Hall, Kavli Royal Society International Centre, Buckinghamshire.
- *Regular Splicing Languages* Workshop in Automata Theory and Symbolic Dynamics, Pacific Institute of Mathematics, University of British Columbia, June 2–8, 2013.
- *Recursion and spatial aperiodic arrangements in molecular self-assembly* Advances in Molecular Programming and Computing: Toward Chemistry as a New Information Technology, Copenhagen, Denmark May 2–4, 2013.
- *Describing self-assembly of Nanostructures*, seminar, York Centre for Complex Systems (YCCSA), University of York, UK, June 15, 2012.
- *Homologous DNA recombination through spatial graphs* biomathematics seminar, Imperial College, London, UK June 12, 2012.
- *Automata Generated 2D Languages Implemented by DNA Self-assembly* (colloquium) University of Tampa, Sept. 27, 2011.
- *Splicing languages must have a constant*, Developments in Language Theory 2011, Milano, Italy, July 18–22, 2011.
- *Constants in splicing languages*. Workshop in Language Theory at the Unconventional Computing Meeting 2011, Turku, Finland June 6–10, 2011.
- *DNA rearrangements through spacial graphs*, AMS Meeting, Iowa City, March 15–20, 2011.
- *Finite State Automata by DNA Self-assembly*, IIT 2010, Ohrid, Macedonia
- *Using Automata to Describe Self-assembled Nanostructures* CIAA 2010 Winipeg August 12–15, 2010, Canada.
- *DNA rearrangements through spatial graphs* CIE 2010 lecture in Ponta Delgada, June 30 – July 4, Portugal.
- *DNA rearrangements through spacial graphs* colloquium, University of Milano-Bicocca, June 27, 2010.
- *DNA rearrangements through spatial graphs* MAA Florida joint meeting in Gainesville, February 20, 2010.

Other presentations at professional meetings, last 3 years

- *Detecting reoccurring patterns of scrambled genes* SIAM meeting, Discrete Methods and Molecular Biology, July 2017.
- *Patterns emerging from a scrambled ciliate genome*, Magic in Science, Computability in Europe, Turku, Finland, June 17, 2017.
- *Topological graph theory in DNA self-assembly and DNA recombination* 6th Biennial Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM), Toronto Canada, June 12–15, 2017.
- *Transversal Languages associated with Sierpiński Gasket*, Unconventional Computing and Natural Computing, Manchester July 11–15, 2016.
- *Detecting reoccurring patterns in scrambled genomes* AMS Sectional meeting Athens, GA, March 5–6, 2016.

- *Describing self-assembly of molecular nanostructures* (invited) Automatic Sequences, Number Theory and Aperiodic Order, Tech University Delft, Delft, The Netherlands, October 28–30, 2015.
- *Molecular Ping Pong Game of Life on a 2D Origami Array*, 21st conference on DNA computing and molecular programming, Harvard University, Boston, August 17–21, 2015.
- *Graph Invariants for DNA Rearrangement Processes* 46th Conference on Combinatorics, Graph Theory and Computing, Boca Raton FL, March 2–6, 2015 (invited for special session on graph polynomials).
- *Genus Ranges of 4-regular Rigid Vertex Graphs and Their Chord Diagrams*. Conference on Knot Theory and Its Applications to Physics and Quantum Computing, Dallas TX, January 6–9, 2015 (invited).
- *Four-valent rigid vertex graphs and RNA-guided DNA rearrangements* BEER conference, Claremont CA, October 11–14, 2014 (invited).
- *Languages associated with crystallographic structures* UCNC 2014, July 14–18, 2014, London Ontario, Canada.
- *Languages associated with crystallographic structures* 1098th AMS Special Session on Crystallography, meeting at University of Maryland, Baltimore County, March 29-30, 2014.

MAJOR ADVISOR:

Post-doctoral scholars:

- Jonathan Burns (august 2014 – August 2016) joint University of Princeton – USF postdoctoral scholar (NIH grant funded, co-mentored with Masahico Saito and Laura L. Landweber at Princeton).
Current appointment: a Research Scientist at *Ionic Security*, a data security company.
- Jennifer Padilla (September 2011 – March 2014) joint USF – New York University postdoctoral scholar (NSF grant funded, co-mentored with Nadrian C. Seeman at NYU where the experimental component of the project was performed).
Current appointment: Assistant Research Professor at Boise State University, Boise, ID.

Major advisor for PhD dissertations:

- Angela Angeleska (co-mentored with M. Saito) *Combinatorial models for gene rearrangements in ciliates* (graduated May 2009). First appointment: University of Tampa, Assistant Professor, tenure track, currently tenured.
- Jonathan Burns, (co-mentored with A. Grinshpan) title: *Recursive Methods in Number Theory, Combinatorial Graph Theory, and Probability* (graduated August 2014). First appointment: joint Princeton University -USF postdoc. Currently a research associate at *Ionic Security*.
- Daniel Cruz, (current student).
- Egor Dolzhenko title: *Modeling state transitions with automata* (graduated May 2013) University of Southern California (Assistant Research Professor). Currently a research associate at *Illumina*.

- Daniela Genova, title: *Forbidding and enforcing properties in graphs and languages* (graduated July 2007). First appointment: University of North Florida, Assistant Professor (tenure-track), currently tenured.
- Daria Karpenko, title: *Active Tile Self-assembly and Simulations of Computational Systems* graduated May 2015. First appointment QA analyst at *Accusoft*.
- David Kephart, title *Topology, Morphisms and Randomness in the Space of Formal Languages* (graduated June 2005). First appointment: Link Systems (software development). Currently Director of Academic Research at Link-Systems International, Inc.
- Kalpana Mahalingam, title *Involution Codes: with applications to DNA strand design* (graduated July, 2004). First appointment: University of Western Ontario, Postdoctoral associate. Currently: Indian Institute of Technology, Chennai, India, Assistant Professor, currently tenured Associate Professor.
- Tilahun Muche, title *Hamiltonian Sets of Polygonal Path in 4-Valent Spatial Graphs* (graduated August 2012). First appointment: Savannah State University, Savannah, GA (tenure-track).
- Joni Pirno, title: *Recognizable Languages Defined by Two-dimensional Shift Spaces* (graduated October, 2006). First appointment: State College of Florida, Manatee-Sarasota, Associate Professor, currently tenured Professor.
- Ana Staninska (co-mentored with G. McColm) title *A Theoretical Model for Self-assembly of Flexible Tiles* (graduated May 2007). First appointment: Max-Planck Institute Leipzig, Germany, Postdoctoral associate.

Mentor (students with extended visits to USF):

- Matteo Cavaliere - University of Sevilla - Spain (Fall 2003) (graduated 2005)
- Giuditta Franco - University of Verona - Italy (Spring 2005) (graduated Spring 2006) post-doctoral associate Fall 2006.

Co-mentor outside USF and/or Opponent

- Phiset Sa-Adryen, New York University - NY *Graph Self-assembly* (co-mentor) 2003
- Gang Wu, New York University - NY topic: *Computation by DNA graph self-assembly*. (co-mentor with N.C. Seeman) 2007
- Banani Chakraborty, New York University - NY topic: *Programmable transducers with DNA tile self-assembly*(co-mentor with N.C. Seeman) 2008.
- Eugen Czeizler, University of Turku, Finland (**opponent**) April 2007.
- Serghei Verlan, Université Paris Est - Créteil Val de Marne (Habilitation Thesis examiner) October 22, 2010.
- Sepinoud Azimi, Abo Akademi University, Turku, Finland (**opponent**) November 2015.
- Vinay Kumar Gautam, Norwegian University of Science and Technology, Trondheim, Norway, (**opponent**) March 22, 2017.

Masters Thesis Mentor:

- Ryan Arredondo title: *Properties of Graphs Used to Model DNA Recombination* graduates May 2014.
- Jasper Braun, current student.
- Grant Conine title: *Topological Data Analysis of Properties of Four-Regular Rigid Vertex Graphs* graduated August 2014.
- Egor Dolzhenko, title: *Transducer Dynamics* graduated May 2008.
- Daria Karpenko, title: *Self-assembly of Self-similar Structures by Active Tiles* graduated May 2012.
- Lukas Nabergall, title: *Patterns in Words Related to DNA Rearrangements* graduation August 2017.

Honors Thesis Mentor:

- Mary Billington, title: *Applications of Mathematics to Biology: Using Combinatorial Models to Understand DNA Rearrangements in Ciliates*, awarded the first prize at the Undergraduate Research Symposium at USF April 2011, graduated May 2011.
- Maja Milošević, title: *An Algorithm for DNA Rearrangement Pathways* graduates May 2014.
- Jamie Sprecher., title *Multicomponent Assembly Graphs in DNA Recombination* graduated May 2013.