Saša Krešić–Jurić

Faculty of Science
Department of Mathematics
University of Split
Ruđera Boškovića 33, 21000 Split

Education

Ph.D. Matematics, University of Georgia, USA, 1995.
Thesis title: *Loop Groups, Integrable Systems of Classical Mechanics, and Discretizations*
Advisor: Prof. Malcolm R. Adams

Research interests: mathematical physics, applied mathematics.

Publications

1. S. Krešić–Jurić, T. Martinić–Bilać, "On symplectic and isospectral integration of the stationary Landau–Lifshitz (Neumann oscillator) equation", Math. Commun. **28**, 11–27 (2023).

2. S. Meljanac, Z. Škoda, S. Krešić–Jurić, "Symmetric ordering and Weyl realizations for quantum Minkowski spaces", J. Math. Phys. **63**, 123508 (2022).

3. S. Meljanac. T. Martinić–Bilać, S. Krešić–Jurić, "Generalized Heisenberg algebra applied to realizations of the orthogonal, Lorentz and Poincaré algebras and thier dual extensions", J. Math. Phys. **61**, 051705 (2020).

4. S. Meljanac, S. Krešić–Jurić, D. Pikutić, "Generalization of Weyl realization to a class of Lie superalgebras", J. Math. Phys. **59** (2), 021701 (2018).

5. S. Meljanac, S. Krešić–Jurić, T. Martinić, "Realization of bicovariant differential calculus on Lie algebra type noncommutative spaces", J. Math. Phys. **58**, 071701 (2017).

6. S. Meljanac, S. Krešić–Jurić, T. Martinić, "The Weyl realizations of Lie algebras, and left–right duality", J. Math. Phys. **57**, 051704 (2016).

7. S. Krešić–Jurić, "Analysis of edge detection in bar code symbols: an overview and open problems", J. Appl. Math. **2012**, Article Id. 758657 (2012).

8. S. Meljanac, S. Krešić–Jurić, R. Štrajn, "Differential algebras on κ-Minkowski space and action of the Lorentz algebra", Int. J. Mod. Phys. A **27** (10), 1250057 (2012).

9. S. Meljanac, S. Krešić–Jurić, "Differential structure on κ–Minkowski space, and κ–Poincaré algebra", Int. J. Mod. Phys. A **26** (20), 3385–3402 (2011).

10. S. Meljanac, S. Krešić–Jurić, "Noncommutative Differential Forms on the kappa–deformed space", J. Phys. A: Math. Theor. **42**, 365204 (2009).

11. S. Meljanac, S. Krešić–Jurić, "Generalized kappa–deformed spaces, star–products, and their realizations", J. Phys. A: Math. Theor. **41**, 235203 (2008).

12. T. Fukuyama, K. Kamimura, S. Krešić–Jurić, S. Meljanac, "Gauge transformations and symmetries of integrable systems", J. Phys. A: Math. Theor. **40**, 12227–12241 (2007).

13. S. Krešić–Jurić, "The Heisenberg magnet equation and the Birkhoff factorization", Ann. Univ. Ferrara **53**, 299–308 (2007).

14. S. Meljanac, S. Krešić–Jurić, M. Stojić, "Covariant realizations of kappa–deformed space", Eur. Phys. J. C **51**, 229–240 (2007).

15. S. Krešić–Jurić, "On the Birkhoff factorization problem for the Heisenberg magnet and nonlinear Schrödinger equations", J. Math. Phys. **47**, 063501 (2006).

16. S. Krešić–Jurić, D. Madej, F. Santosa, "Applications of hidden Markov models in bar code decoding", Pattern Rec. Lett. **27**, 1665–1672 (2006).

17. S. Krešić–Jurić, "Edge detection in bar code signals corrupted by integrated time-varying speckle", Pattern Rec. **38**, 2483–2493 (2005).

18. D. Poljak, S. Krešić–Jurić, "A simplified calculation of transient plane waves in the presence of an imperfectly conducting half–space", Boundary Elements XXVII, 541–549, WIT Trans. Model. Simul. **39**, WIT Press, Southampton, 2005.
(Math. Rev. monographic series)

19. E. Marom, S. Krešić–Jurić, L. Bergstein, "Speckle noise in bar–code scanning systems – power spectral density and SNR", Appl. Opt. **42** (2), 161–174 (2003).

20. E. Marom, S. Krešić–Jurić, "Edge detection in the presence of speckle noise in bar-code scanning systems", Proc. SPIE – The International Society for Optical Engineering **4933**, 382–387 (2003).

21. E. Marom, S. Krešić–Jurić, L. Bergstein, "Analysis of speckle noise in bar-code scanning systems", J. Opt. Soc. Am. A **18** (4), 888–901 (2001).

22. M.R. Adams, S. Krešić–Jurić, "Hamiltonians and zero–curvature equations for integrable partial differential equations", J. Math. Phys. **42** (1), 213–224 (2001).

23. E. Marom, S. Krešić–Jurić, L. Bergstein, "Speckle revisited – Analysis of speckle noise in bar-code scanning systems", Proc. SPIE – The International Society for Optical Engineering **4430**, 361–375 (2000).

24. S. Krešić–Jurić, "A loop group approach to the C. Neumann problem and Moser-Veselov factorization", J. Math. Phys. **40** (10), 5014–5025 (1999).

Professional Experience

- **Faculty of Science, Department of Mathematics, University of Split, Croatia**

  Full Professor, Jan. 2013. – present.
  Associate Professor, July 2007. – Dec. 2012.
  Assistant Professor, March 2006. – June 2007.

- **Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split, Croatia**

  Assistant Professor, Oct. 2001. – Feb. 2006.
  Senior Teaching Assistant, Oct. 2000. – June 2001.

- **Symbol Technologies, Inc., New York, USA**

  Scientific Staff - Advanced Development Department, May 1997. – Aug. 2000.

- **University of Georgia, Department of Mathematics, USA**

  Lecturer, Oct. 1995. – June 1996.
  Teaching Assistant, Oct. 1989. – Aug. 1995.

Administrative Appointments

- *Department Head*, 2008.–2010.
  Department of Mathematics, Faculty of Science, University of Split,

- *Department Head*, 2004.–2006.
  Division of Mathematics and Physics, Faculty of Electrical and Mechanical Engineering, and Naval Architecture, University of Split,

Editorial Service

Acta Mathematica Spalatensia, Editor–in–Chief, Sept. 2019. – present.

Ph.D. Supervision

T. Martinić, *Realizations of Lie algebras and differential calculus on noncommutative spaces*, Ph.D., University of Zagreb, Dec. 2016.

Research Projects

1. *Lie Groups, Integrable Systems and Symmetries* (principal investigator), funded by Croatian Ministry of Science, 2007.–2014.

2. *Calculus of Variation and Signal Processing* (principal investigator), funded by Croatian Ministry of Science, 2002.–2006.

3. *Quantum Field Theory, Noncommutative Spaces and Symmetries* (member), funded by Croatian Ministry of Science, 2007.–2014.

4. *Towards quantum gravity: noncommutative geometry, field theory and cosmology* (member), funded by Croatian Science Foundation, IP–2014–09–9582, 2015.–2017.

5. *Algebraic Methods in Mathematical Physics* (member), bilateral Croatian–Hungarian project, 2009.–2011.

6. *κ-Minkowski spacetime: formalism and applications* (member), bilateral Croatian–Polish project, 2008.–2011.

Invited Lectures

1. *Gauge transformations and symmetries of evolution equations*, Recent progress in quantitative analysis of multiscale media, Faculty of Science, University of Split, Croatia, May 2023.

2. *Geometrical Aspects of Hamiltonian Systems and Symplectic Integration Methods*, Doctoral Program in Mathematics, Faculty of Science, University of Cadiz, Spain, Nov. 2021.

3. *Integrable Systems and Factorization Problems on Loop Groups*, Izmir Institute of Technology, Department of Mathematics, Izmir, Turkey, Nov. 2018.

4. *Integrable systems, geometry and group theory*, Students to Students Split Summer School, University of Split, Croatia, Sept. 2017.

5. *Differential calculus on quantum spaces via deformation theory*, Topological and Geometrical Aspects of Quantum Spaces Field Theory and Causal Structure, SISSA, Trieste, Italy, March 2017.

6. *Differential structures on κ-Minkowski space, and Lorentz algebra*, Faculty of Physics and Astronomy, University of Wroclaw, Poland, Nov. 2010.

7. *Kappa-deformed spaces and differential forms*, Department of Mathematics, J. J. Strossmayer University, Osijek, Croatia, May 2009.

8. *Integrable systems and factorization problems*, KFKI Research Institute for Particle and Nuclear Physics of the Hungarian Academy of Sciences, Budapest, Hungary, April 2007.

9. *Loop groups, integrable systems and Segal-Wilson Grassmannian*, Ruđer Bošković Institute, Zagreb, Croatia, Dec. 2005.

10. *Speckle noise and laser scanning systems*, Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, USA, Feb. 2000. (www.ima.umn.edu/industrial/99-2000/kresic/index.html).

11. *Loop Groups, Integrable Systems and Discretizations*, Department of Mathematics, University of California, Riverside, USA, April 1995.

Conference Lectures

1. *Symplectic and isospectral integration of the stationary Landau–Lifshitz equation* (poster), XXX International Fall Workshop on Geometry and Physics, ICMAT, Madrid, Aug. 2022.

2. *Hamiltonian integrable systems and geometric numerical integration*, Split Applied Mathematics Day 2018, Faculty of Science, University of Split, Croatia, June 2018.

3. *Realizations of Lie algebras, left–right duality, and differential forms on noncommutative spaces*, The XXIV International Conference on Integrable Systems and Quantum Symmetries, Prague, June 2016.

4. *Differential structure on κ–Minkowski space, and κ–Poincaré algebra*, Noncommutativity and Physics: Spacetime Quantum Gravity, Bayrischzell, Germany, May 2010.

5. *Generalized kappa-deformed spaces, star–products and their realizations*, The XVII International Colloquium on Integrable Systems and Quantum Symmetries, Prague, June 2008.

6. *The Heisenberg magnet equation and the Birkhoff factorization*, ApplMath05, Fourth Conference on Applied Mathematics and Scientific Computing, Brijuni, Croatia, June 2005.

7. *Edge detection in signals corrupted by speckle noise*, Third Croatian Congress of Mathematics, Split, Croatia, June 2004.

8. *Speckle noise and edge localization error*, SoftCom 2003, Eleventh International Conference on Software, Telecommunications and Computer Networks, Split–Venice–Ancona–Dubrovnik, Sept. 2003.

9. *Edge detection in the presence of speckle noise in barcode scanning systems*, Speckle Metrology 2003, Trondheim, Norway, June 2003.

10. *Hidden Markov model for bar code de–noising*, AutoID 2002, IEEE Workshop on Automatic Identification Advanced Technologies, Terrytown, USA, March 2002.

11. *Effects of speckle noise on barcode laser scanning*, Technology Conference 2000, Las Vegas, USA, Feb. 2000.

12. *A loop group construction of the AKNS soliton equations*, Math/Chem/Comp '98, Thirteenth International Course and Conference on the Interfaces among Mathematics, Chemistry and Computer Science, Dubrovnik, Croatia, June 1998.

13. *Loop groups, integrable systems of classical mechanics, and discretizations*, Math/Chem/Comp '96, Eleventh International Course and Conference on the Interfaces among Mathematics, Chemistry and Computer Science, Dubrovnik, Croatia, June 1996.

14. *Two approaches to integrable nonlinear differential equations*, Seventh Annual Southeast Geometry Conference, University of South Carolina, Columbia, USA, May 1996.

15. *Loop groups, discretized Neumann oscillator, and the matrix Riccati equation*, Geometric Mechanics, Dynamical Systems and Control Theory, University of Arkansas, USA, April 1995.

Seminar Lectures and Workshops

1. *Gauge Transformations and Symmetries of Integrable Systems*, Faculty of Science, University of Cadiz, Spain, March 2023.
2. *Algebraic Methods in Mathematical Physics*, bilateral Croatian–Hungarian project, Department of Mathematics, University of Zagreb, Croatia, May 2011.
3. *Colloquium of the Mathematical Society of Split*, Faculty of Science, Univesity of Split, Croatia, June 2009.
4. *Algebra Seminar*, Department of Mathematics, University of Zagreb, Croatia, March 2008.
5. *Division of Theoretical Physics Seminar*, Rudjer Bošković Institute, Zagreb, Croatia, Dec. 2006.
6. *Colloquium of the Croatian Mathematical Society*, Faculty of Science, University of Split, Croatia, May 2002.
7. *Mathematical Physics Seminar*, University of Georgia, Athens, USA, June 1995.
8. *Geometry Seminar*, University of Georgia, Athens, USA, March 1995.

Short Term Scientific Visits

1. University of Cadiz, Faculty of Science, Cadiz, Spain, March 2023.
2. University of Cadiz, Faculty of Science, Cadiz, Spain, Nov. 2021.
3. Izmir Institute of Technology, Izmir, Turkey, Nov. 2018.
4. KFKI Research Institute for Particle and Nuclear Physics of the Hungarian Academy of Sciences, Budapest, Hungary, Dec. 2010.
5. Institute of Theoretical Physics, Department of Physics and Astronomy, University of Wroclaw, Poland, Nov. 2010.
6. KFKI Research Institute for Particle and Nuclear Physics of the Hungarian Academy of Sciences, Budapest, Hungary, April 2007.
7. Symbol Technologies, Inc., Advanced Development Department, Holstivlle, USA, June 2005.
8. Symbol Technologies, Inc., Advanced Development Department, Holstville, USA, July – August 2002.

9. Symbol Technologies, Inc., Advanced Development Department, Holstsville,USA, July – August 2001.

10. Institute for Mathematics and its Applications, University of Minnesota, Minnesota, SAD, June 2000.

11. University of Kansas, Department of Mathematics, Lawrenceville, USA, Aug. – Dec. 1992.

Teaching Experience

- **Undergraduate courses**
  Operators on Normed Spaces, Algebraic Structures, Partial Differential Equations, Linear Algebra and Matrix Calculus, Differential and Integral Calculus, Complex Analysis.

- **Graduate courses**
  Mathematical Methods in Engineering

Professional Memberships

- American Mathematical Society, 1989. – 2019.

- Society for Industrial and Applied Mathematics, 2003 .– 2004.