

Sylvain Carpentier

Seoul National University
sylcar@snu.ac.kr

Research Interests

Integrable systems, Lax operators, Poisson geometry, algebraic quantization, discrete integrable dynamics.

Employment

-BK21 Postdoctoral Fellow, Seoul National University	2024- present
-Senior Researcher, QSMS , Seoul National University	2022-2024
-Simons Junior Fellow, Columbia University	2017-2021

Education

-PhD in Mathematics, Massachusetts Institute of Technology , Advisor: Victor Kac	2013-2017
Thesis: <i>Rational Differential Operators and Integrable Systems of Partial Differential Equations</i>	
-Master of mathematics, Universite Pierre et Marie Curie	2011-2012
- Ecole Normale Supérieure de Paris	2009-2013

Awards and Fellowships

- Simons Junior Fellowship, Columbia University,	2017-2021
- Charles W. and Jennifer C. Johnson Prize, MIT	2017

Conference Organization:

- 2025 SNU workshop for representation theory and related topics, Incheon	08/2025
- 2024 SNU workshop for representation theory and related topics, Gangcheon	08/2024

Selected invited talks

-Korean Mathematics Society meeting	10/2025
-Ningbo, China, workshop on Poisson geometry and integrability,	09/2025
- Postech, Pohang, South Korea,	04/2024
- Universita della Sapienza, Roma,	02/2024
- <i>SusTech, Schenzhen, China, Efim Zelmanov's seminar</i>	12/2023
- <i>Conference on Algebraic Representation Theory</i> Taiwan NCTS,	12/2023
- <i>Incheon National University, 9th China Japan Korea International Conference</i> ,	08/2023
- Université de Dijon, France,	05/2023
- <i>Poisson and quantum structures in Integrable systems</i> at University of Leeds	05/2023
- Kolchin seminar, City University of New York	09/2022
- MIT infinite dimensional algebra seminar	03/2022

Teaching Experience

- Seoul National University, graduate students mentoring,	2022-present
- Columbia University, Calculus II lecturer	2018
-MIT, teaching assistant for linear algebra	2016-2017
- MIT, Undergraduate Research mentor at SPUR program,	2015

Preprints

- Integrable Volterra hierarchies over nonabelian algebras,* 2026
with A. Mikhailov, J.P. Wang, arXiv 2607.17868.
- Arithmetic supports of Lax difference hierarchies,* 2026
arXiv:2606.24273.
- Algebraic quantisation approach to integrable differential-difference equations,* 2025
with A. Mikhailov, J.P. Wang, arXiv 2509.21775.

Main Publications

- Gelfand-Dickey realization of the supersymmetric W algebras for $gl(n+1, n)$ and $gl(n, n)$,* 2025
with U. Suh, nonlinearity, 38, 11 .
- Hamiltonians for the quantised Volterra hierarchy,* 2024
with A. Mikhailov, J.P. Wang, nonlinearity 37 095033 .
- Integrable systems on rectangular superalgebras via super Adler-type operators,* 2024
with G. Lee, U. Suh, Communications in Mathematical Physics, Vol.405 No.7, p. 165.
- Quantisations of the Volterra hierarchy,* 2022
with A. Mikhailov, J.P. Wang, Lett Math Phys 112, 94.
- Supersymmetric Bihamiltonian Integrable Systems,* 2021
with U. Suh, Communications in Mathematical Physics, 382, 317-350.
- p -reduced multicomponent KP hierarchy and classical W -algebras,* 2020
with A. De Sole, V. Kac, D. Valeri and J. Van de Leur,
Communications in Mathematical Physics, 380 (2) 655-722.
- PreHamiltonian and Hamiltonian operators for differential-difference equations,* 2020
with A. Mikhailov and J.P. Wang, Nonlinearity, 33 (3) article Number 915.
- Rational recursion operators for integrable differential-difference equations,* 2019
with A. Mikhailov and J.P. Wang, Commun. Math. Phys. 370, 807–851.
- Compatible Hamiltonian operators for the Krichever-Novikov equation,* 2017
C. R. Math. Vol. 355, Issue 7, 744-747.
- A sufficient condition for a Rational Differential Operator to generate an Integrable System,* 2017
Japan. J. Math. 12, 33-89.
- Singular degree of a rational matrix pseudodifferential operator,* 2015
with A. De Sole, V.G. Kac, Int. Math. Res. Not. IMRN 2015, no. 13, 5162 -5195.
- Rational matrix pseudodifferential operators,* 2013
with A. De Sole, V.G. Kac, Selecta Math. (N.S.) 20 (2014), no. 2, 403-419.
- Some algebraic properties of differential operators* 2012
with A. De Sole, V.G. Kac, J. Math. Phys. 53 (2012), no. 6, 063501, 12 pp.

Languages

French (native), English (fluent), Spanish (proficient), Korean (intermediate)