Sylvain Carpentier

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Department of Mathematics, Columbia University
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Research Interests
Mathematical physics, integrable systems, noncommutative algebra.

Employment
Simons Postdoctoral Research Scientist at **Columbia University** 07/2017-06/2021

Education
-Graduate student at the **Massachusetts Institute of Technology**, Cambridge MA, supervised by Victor Kac 2013-2017
-Master of mathematics at **Universite Paris Orsay**, mention Très Bien 2011-2012
-Student of the **Ecole Normale Superieure de Paris** 2009-2013

Diplomas and Awards
- PhD in Mathematics, Massachusetts Institute of Technology 06/2017
- Johnson Prize for best graduate mathematical paper of the year at MIT 05/2017
A sufficient condition for a Rational Differential Operator to generate an Integrable System

Selected Talks
-Université d'Angers, 03/2021
-Seoul National University, 12/2020
-Geometric and automorphic aspects of W algebras, Lille 3 05/2019
-Univeristy of Glasgow, integrable system seminar 04/2019
-Univeristy of Kent, Canterbury, 04/2019
- DART IX, University of Leeds 08/2018
- Seminar of Mathematical physics, University of Columbia 04 and 11/2018
- Kolchin seminar, City University of New York Graduate Center 09/2017
- Univeristy of Kent, Canterbury 07/2017
- MIT Infinite dimensional algebra seminar, PhD defense 04/2017
- SISSA, Trieste 07/2016

Conferences and research visits
- *DART IX* at Univeristy of Leeds 08/2018
- *Representation Theory, Mathematical Physics and Integrable Systems* at CIRM, Luminy, France 06/2018
- University of kent, UK, visiting J.P. Wang and A. Mikhailov 07/2017
- *Geometry and Representation Theory*, Schrodinger Institute, Vienna 01/2017
-SISSA, Trieste, visiting V. Kac and B. Dubrovin 07/2016
- *Perspectives in Lie Theory*, Centro de Giorgi, Pisa 01/2015
-Universita di la Sapienza, Rome, visiting Alberto De Sole 05-07/2014
-IHES, Bures sur Yvette, France 2012/2013
-*Algebraic Structures in Integrable Systems* at Moscow State University, 12/2012

Publications

Supersymmetric Bihamiltonian Integrable Systems, 2021
(with U. Suh), Communications in Mathematical Physics, 382, 317-350.

Lax-Sato formulation of the Novikov-Veselov hierarchy, 2020
arXiv:2004.08489

p-reduced multicomponent KP hierarchy and classical W-algebras, 2020
(with A. De Sole, V. Kac, D. Valeri and J. Van de Leur), Com. in Math. Ph., 380, 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, 807851 (2019)

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 2017
an Integrable System, Japan. J. Math. 12, 33-89 (2017)

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.

Some remarks on non-commutative principal ideal rings 2013
(with A. De Sole, V.G. Kac), Comptes rendus Mathematique 351 (2013), 5-8.

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.

Teaching

-Calculus II at Columbia University, Fall 2018
-Teaching assistant for linear algebra at MIT, 2016/2017
- Undergraduate Research mentor at MIT, Summer 2015
-Teaching assistant for mathematiques I at Paris 7 Fall 2013

Languages

French (native), English (fluent), Spanish (proficient), Korean and Italian (beginner)

Other interests

Concert pianist. 1st prize in the outstanding amateur piano competition in Paris (2013). Played with the Boston pops orchestra in 2017.