Danilo **Lewański**

Curriculum Vitae

PERSONAL INFORMATIONS:

⚑ Italian citizen

🎂 27 September 1989

✉ danilo.lewanski@units.it

🏠 Università di Trieste, Sezione di Matematica, via Valerio 12/1 - 34127 Trieste

🖧 https://sites.google.com/view/danilolewanski

Education and professional experience

Ricercatore di tipo b). (Assistant/Associate Professor)   *U Trieste, IT*
since 2022

SC 01/A2 (Geometry and Algebra), SSD MAT/03 (Geometry).

Principal Investigator of SNF Ambizione Grant   *U Genève, CH*
Nov 21 - Oct 25

Project "Resurgent Topological Recursion, Enumerative Geometry and Integrable Hierarchies", funded by the Swiss National Science Foundation ($\sim$ 1M CHF).

Post-doctoral researcher   *IHES and IPhT, Paris, FR*
Nov 19 - Oct 21

Funded by the ERC Synergy Grant "ReNewQuantum" with PI Prof. Andersen, Prof. Eynard, Prof. Kontsevich, Prof. Mariño.

Post-doctoral researcher   *Max-Planck-Institut, Bonn, DE*
Nov 17 - Oct 19

PIs: Gaëtan Borot and Don Zagier.

Ph.D. in Mathematics   *Univ. Amsterdam, NL*
Nov 13 - Oct 17

Thesis Title: *"Enumerative geometry and moduli spaces of curves via topological recursion"*
Topics: Algebraic Geometry and Mathematical Physics
Supervisor: Sergey Shadrin

M.Sc. in Mathematics   *Università di Padova, IT*
Sep 11 - Jul 13

Specialization in Algebra, Geometry and Number Theory (ALGANT courses)
Thesis title: *"Moduli Spaces in Algebraic Geometry"* on Mumford's Geometric Invariant Theory
Thesis Supervisor: Francesco Bottacin

B.Sc. in Mathematics   *Università di Bologna, IT*
Sep 09 - July 11

Thesis title: *"Knot Theory of robotic arms in 3D and 4D spaces"* on Algebraic Topology
Thesis Supervisor: Massimo Ferri

Publications and preprints

An intersection-theoretic proof of the Harer-Zagier formula

Accepted in Algebraic Geometry

Joint work with A. Giacchetto, P. Norbury

Article
2021

On some hyperelliptic Hurwitz-Hodge integrals

arXiv:2112.02178, submitted

Article
2021

A natural basis for intersection numbers

arXiv:2104.05697, submitted

Joint work with B. Eynard

Article
2021

A new spin on Hurwitz theory and ELSV via theta characteristics

arXiv:2104.05697, submitted

Joint work with A. Giacchetto, R. Kramer

Article
2021

On the Kontsevich Geometry of the combinatorial Teichmüller space

arXiv:2010.11806, submitted

Joint work with J. Andersen, G. Borot, S. Charbonnier, A. Giacchetto, C. Wheeler

Article
2020

On the Goulden-Jackson-Vakil conjecture for double Hurwitz numbers

Advances in Mathematics 403, 108339

Joint work with N. Do.

Article
2020

Double Hurwitz numbers: polynomiality, topological recursion and intersection theory

arXiv:2002.00900, Accepted in Math. Annalen

Joint work with G. Borot, N. Do, M. Karev, E.Moskovsky.

Article
2020

Masur-Veech volumes and intersection theory: the principal strata of quadratic differentials

arXiv:1912.02267, Accepted in Duke Mathematical Journal

D. Chen, M. Möller, A. Sauvaget, with an appendix joint with G. Borot, A. Giacchetto

Appendix
2019

Topological recursion for Masur-Veech volumes

arXiv:1905.10352, submitted

Joint work with J. Andersen, G. Borot, V. Delecroix, S. Charbonnier, A. Giacchetto, C. Wheeler

Article
2019

Wall-crossing and recursion formulae for tropical Jucys covers

Transactions of the American Mathematical Society 373 (2020), 4685-4711

Joint work with M. Anas Hahn.

Article
2019

Half-spin tautological relations and Faber's proportionalities of kappa classes

SIGMA: Symmetry, Integrability and Geometry: Methods and Applications, 15, [080]

Joint work with E. Garcia Failde, R. Kramer, S. Shadrin

Article
2019

Tropical Jucys covers

Mathematische Zeitschrift (2022)

Joint work with M. Anas Hahn.

Article
2018

Harer-Zagier formula via Fock space

Communications in Number Theory and Physics, 13 (2019), 3, 619-626

Article
2018

Wall-crossing formulae and strong piecewise polynomiality for mixed Grothendieck dessins d'enfants, monotone and simple double Hurwitz numbers

Advances in Mathematics 336 (2018), 38-69

Article

2017

    Joint work with M. Anas Hahn, R. Kramer.

Special cases of the orbifold version of Zvonkine's r-ELSV formula

Michigan Mathematical Journal, 70(2): (2021), 369-402.

Article

2017

    Joint work with G.Borot, R.Kramer, A. Popolitov, S. Shadrin.

Towards an orbifold generalization of Zvonkine's r-ELSV formula

Transactions of the American Mathematical Society, 372 (2019), 4447-4469

Article

2017

    Joint work with R.Kramer, A. Popolitov, S. Shadrin.

On ELSV-type formulae, Hurwitz numbers and topological recursion

AMS Proceedings of Symposia in Pure Mathematics, Volume 100, 2018.

https://doi.org/10.1090/pspum/100/01764.

Expository

2017

The tautological ring of $\mathcal{M}_{g,n}$ via Pandharipande-Pixton-Zvonkine r-spin relations

Algebraic Geometry 5.6 (2018), 703-727

Article

2017

    Joint work with R.Kramer, F. Labib, S. Shadrin

Quasi-polynomiality of monotone orbifold Hurwitz numbers and Grothendieck's dessins d'enfant

Documenta Mathematica 24, 857-898 (2019)

Article

2016

    Joint work with R.Kramer, S. Shadrin

Ramifications of Hurwitz theory, KP integrability and quantum curves

Journal of High Energy Physics, 2016(5), December 2015

Article

2016

    Joint work with A. Alexandrov, S. Shadrin

$\mathcal{W}$-algebra constraints and topological recursion for A_N-singularity

International Journal of Mathematics 27, 1650110(2016)

Appendix

2016

    The main author is T. Milanov, appendix by D. Lewanski

Polynomiality of orbifold Hurwitz numbers, spectral curve, and a new proof of the Johnson-Pandharipande-Tseng formula

Journal of the London Mathematical Society 92(3), 547-565, April 2015.

Article

2015

    Joint work with P. Dunin-Barkowski, A. Popolitov, S. Shadrin

Chiodo formulas for the r-th roots and topological recursion

Letters in Mathematical Physics, 107(5), 901-919.

Article

2015

    Joint work with A. Popolitov, S. Shadrin, D. Zvonkine

Awards, titles, certifications

Nov 2021 - Oct 2025	SNF Ambizione Grant ($\sim$ **1M** CHF)
May 2021 - Apr 2030	Abilitazione Scientifica Nazionale, Fascia II, Geometria e Algebra (Italian Abilitation)
Nov 2021 - Oct 2023	Part of **ERC Consolidator** Grant "ROGW" n. 864919 ($\sim$**2M** Euros) as postdoctoral researcher (declined)
Nov 2021 - Oct 2024	Assegno di Eccellenza MIUR at SISSA, Trieste, IT (3 years contract, excellent postdocs provided at the national level, declined)
Nov 2019 - Oct 2021	Part of **ERC Synergy** Grant "ReNewQuantum" n. 810573 ($\sim$ **10M** Euros) as postdoctoral researcher, PI: Profs. Jørgen Andersen, Bertrand Eynard, Maxim Kontsevich, Marcos Mariño.

Partecipation in research projects

Nov 2021 - Oct 2025	PI of **SNF Ambizione** Grant ($\sim$**1M** CHF)
Nov 2021 - Oct 2023	Part of **ERC Consolidator** Grant "ROGW" n. 864919 ($\sim$**2M** Euros) as postdoctoral researcher, PI: Prof. Penka Giorgieva.
Nov 2019 - Oct 2021	Part of **ERC Synergy** Grant "ReNewQuantum" n. 810573 ($\sim$**10M** Euros) as postdoctoral researcher, PI: Profs. Jørgen Andersen, Bertrand Eynard, Maxim Kontsevich, Marcos Mariño.
Nov 2013 - Oct 2017	Part of **NWO-VICI** Research Grant ($\sim$**1.5M** Euros) as PhD candidate, PI: Prof. Sergey Shadrin.
2019 - 2021	Part of **GNSAGA**: Italian Research Group for Algebraic and Geometric structures and their Applications

Scientific expeditions

SISSA, Trieste (IT)	Teaching and research visit, Apr - May 2022
IPhT and IHES, Paris (FR)	Research visit with host Prof. E. Eynard and several collaborators, Nov 2021 - Feb 2022
UniSalento University (IT)	Research visit with host Prof. R. Vitolo, June 2021
Melbourne University (AU)	Research visit with host Prof. P. Norbury, March 2020
Monash University, Melbourne (AU)	Research visit with host Prof. N. Do, February 2020
Amsterdam University (NL)	Research visit with host Prof. S. Shadrin, July 2019
Monash University, Melbourne (AU)	Bartnik Visiting Grant awardee ($\sim$8K AUD) with host Prof. N. Do, February 2019
Institut Henri Poincaré, Paris (FR)	Thematic trimester *Combinatorics and interactions*, February-March 2017
Matrix Institute, Creswick (AU)	Event *Interactions between topological recursion, modularity, quantum invariants and low-dimensional topology*, November-December 2016

Events organised

Sep 2022	Organiser of PhD + Postdoc Advanced school in Otranto, IT. Funded by ERC Synergy ReNewQuantum project
Mar 2022	Organiser of Algebraic Geometry researchers workshop in Leysin, CH. Funded by own SNF grant
Mar 2022	Organiser of intersection theory software developing workshop in Les Diablerets, CH. Funded by own SNF grant
Sep 2021	Organiser and lecturer of Master students + PhD School in Otranto, IT. Funded by ERC Synergy ReNewQuantum project
Sep 2021	Organiser of PhD + Postdoc Advanced school in Otranto, IT. Funded by ERC Synergy ReNewQuantum project
Sep 2021	Organiser of researcher collaborative open-problem workshop in Otranto, IT. Funded by ERC Synergy ReNewQuantum project

Selected Talks

Moduli spaces of curves and their cohomology *Bari, IT*

Seminar *Jan, 2022*

Spin structures and Gromov-Witten theory *Palermo, IT*

Seminar *Nov, 2021*

Recursive universal procedures for enumerative algebraic geometry *IBS, Pohang, KOREA*

Mathematical Physics Seminar *Nov, 2021*

Discussant for John Novak *Norway*

Combinatorics and Topological Recursion conference *Nov, 2021*

ELSV formulae

Oberwolfach, DE

Tropical Curves, Logarithmic Structures, and Enumerative Geometry

Oct, 2021

Dubrovin-Frobenius manifolds and topological recursion

SISSA, Trieste, IT

Mathematical Physics Seminar

Oct, 2021

Recursive universal procedures for enumerative algebraic geometry

Padova, IT

CAGA Seminar

Oct, 2021

Counting graphs on surfaces

UniMore, IT

Seminar

Oct, 2021

Enumerative geometry and mathematical physics

Bicocca, Milano, IT

Seminar

Jul, 2021

A new spin for Hurwitz numbers and Chiodo classes

Oberwolfach, DE

Enumerative geometry of surfaces

Jun, 2021

A new spin for Hurwitz numbers and Chiodo classes

Moscow, RUS

Conference MoSCATR VII

Jun, 2021

Topological Recursion and moduli spaces of curves.

Bologna University, IT

Jun 2021

Cohomologie des espaces de modules des courbes de la physique mathématique.

IMB, Dijon, FR

Mathematical Physics Seminar

Mar, 2021

ELSV-type formulae and new conjectures for BKP integrability II .

Higher School for Economics, Moscow, RUS

International Topological Recursion and Integrability Seminar

Mar, 2021

ELSV-type formulae and new conjectures for BKP integrability I .

Higher School for Economics, Moscow, RUS

International Topological Recursion and Integrability Seminar

Mar, 2021

Cohomologie des espaces de modules des courbes de la physique mathématique.

IMB and LaBRI, Bordeaux, FR

General Mathematical Seminar

Feb, 2021

Mathematical Physics for the Algebraic Geometry of moduli spaces of curves.

Copenhagen University, DK

Feb 2021

Interaction between string theory, integrable systems and moduli spaces of curves.

KU Leuven, BE

Geometry Seminar

Feb 2021

Topological recursion, matrix models, and moduli spaces of curves.
Mathematical Physics Seminar

SISSA Trieste, IT

Jan, 2021

Resurgent Topological Recursion.
Conference Winter School in Mathematical Physics 2021

Les Diablerets, CH

Jan 2021

Topological Recursion for Hurwitz theory and intersection theory of moduli spaces of curves.

Bologna University, IT

Jan 2021

Hurwitz theory, topological recursion, and ELSV formulae
Conference Topological and Geometric Recursion in Interaction with Resurgence

Miami, USA

Feb, 2020

Resurgence theory
University of Melbourne

Melbourne, RUS

Feb, 2020

On a conjecture of Goulden, Jackson, and Vakil
Jussieu Enumerative geometry seminar

Paris, FR

Dec 5, 2019

Topological recursion and Masur-Veech volumes
IHES Enumerative geometry seminar

Paris, FR

Dec 2, 2019

Topological recursion and Masur-Veech volumes
International Symposium Quantum Theory and Symmetries at CRM Montré al

Montré al, CAN

Jul 2, 2019

Tropical Jucys covers
Université de Genève

Genève, CH

Mar 18, 2019

Virasoro contraints for simple maps and free probability
Conference MoSCATR VI

Moscow, RUS

June 7, 2018

Tautological ring and Pandharipande-Pixton-Zvonkine tautological relations
Université de Bourgogne

Dijon, FR

Sep 7, 2017

Orbifold Hurwitz numbers, topological recursion and ELSV-type formulae
Winter School on Combinatorics and Interactions, CIRM

Marseille, FR

Jan 13 , 2017

Topological recursion and Hurwitz numbers
Conference Topological recursion and modularity

Matrix center, Creswick, AUS

Dec 22, 2016

From Topological Recursion to Johnson-Pandharipande-Tseng Formula (and back)
2016 AMS von Neumann Symposium: Topological Recursion and its Influence in Analysis, Geometry, and Topology

Charlotte, NC, USA

Jul 6, 2016

On Hurwitz enumerative problems   *Moscow, RUS*

Fifth Workshop on Combinatorics of Moduli Spaces, Hurwitz numbers, and Cohomological Field Theories   *Jun 9, 2016*

Gromov-Witten Invariants   *Bologna, IT*

Conference Prospectives in Physical Mathematics   *Dec 18, 2014*

Service

Editor   Special Issue on *Topological Recursion and its applications*, Journal of Geometry and Physics (JGP), Guest editor with G. Borot, B. Eynard, E. Garcia–Failde.

Referee   Referee for Manuscripta Mathematica, Communications in Mathematical Physics, Journal of High Energy Physics, Selecta Mathematica, SIGMA, Bulletin of London Mathematical Society

Committee   Msc thesis reviewer for Mikhael Lozhkin, St. Petersburg Department of Steklov Mathematical Institute of Russian Academy of Sciences

Conferences

TRSalento2021: School/Workshop on Topological Recursion   *Otranto, Salento region, IT*

                                                                                 Sep 6- Sep 17, 2021

Noncommutative geometry meets topological recursion   *Münster, DE*

                                                                                 Aug 16 - Aug 20, 2021

MFO Workshop: Enumerative geometry of surfaces   *Oberwolfach, DE*

                                                                                 Jun 14 - Jun 18, 2021

MOSCATR VII: 7th Workshop on Combinatorics of Moduli Spaces, Cluster Algebras, and Topological Recursion   *Moscow, RUS*

                                                                                 May 31 - Jun 5, 2021

Conference Winter School in Mathematical Physics 2021   *Les Diablerets, CH*

                                                                                 Jan 2021

Conference Topological and Geometric Recursion in Interaction with Resurgence   *Miami, USA*

                                                                                 Feb, 2020

International Symposium Quantum Theory and Symmetries at CRM Montré al   *Montré al, CAN*

                                                                                 Jul 2, 2019

ICM 2018: International Conference of Mathematicians   *Rio, BR*

                                                                                 Aug 1-9, 2018

MOSCATR VI: 6th Workshop on Combinatorics of Moduli Spaces, Cluster Algebras, and Topological Recursion   *Moscow, RUS*

                                                                                 June 4-9, 2018

Workshop on Moduli Spaces of Curves, Integrable Systems and related subjects

Dijon, FR
Sep 4-8, 2017

Trimester Combinatorics and Interactions, IHP

Paris, FR
Feb 27- Mar 31, 2017

Winter school on combinatorics and interactions, CIRM

Marseille, FR
Jan 9-13, 2017

Interactions between Topological recursion, modularity, quantum invariants and low-dimensional topology, Matrix center

Creswick, AUS

Nov 28 - Dec 23, 2016

2016 AMS von Neumann Symposium: Topological Recursion and its Influence in Analysis, Geometry, and Topology

Charlotte, NC, USA

Jul 4-8, 2016

Fifth Workshop on Combinatorics of Moduli Spaces, Hurwitz numbers, and Cohomological Field Theories
HSE, STEKLOV INSTITUTE, SKOLKOVO INSTITUTE OF SCIENCE AND TECHNOLOGY AND INDEPENDENT UNIVERSITY

Moscow, Russia

Jun 6-11, 2016

2015 AMS Summer Research Institute in Algebraic Geometry
UNIVERSITY OF UTAH

Salt Lake City, UT, USA
Jul 13-24, 2015

Counting Instantons
LORENTZ CENTER

Leiden, The Netherlands
Jun, 16-20, 2015

Workshop on mathematical physics
UNIVERSITEIT VAN AMSTERDAM
In occasion of the PhD Defense of Petr Dunin-Barkowski

Amsterdam, The Netherlands
May 26-28, 2015

Perspectives in Physical Mathematics
UNIVERSITÀ DI BOLOGNA

Bologna, Italy
Dec 18-19, 2014

Geometry and Quantum Theory Colloquium
GQT CLUSTER

The Netherlands
Nov 6-7, 2014

Geometry and Quantum Theory Colloquium
GQT CLUSTER

The Netherlands
Jul 3-4, 2014

Workshop on Instanton Counting: Moduli Spaces, Representation Theory and Integrable Systems
LORENTZ CENTER

Leiden, The Netherlands

Jun 16, 2014

Fourth Workshop on Combinatorics of Moduli Spaces, Cluster Algebras and Topological Recursion

HSE, Steklov Institute, and Independent University

Moscow, Russia

May 26-31, 2014

Mirror Symmetry and Spin Curves

Palazzone di Cortona

Cortona, Italy

Apr 28-30, 2014

On Quantization of Moduli Spaces

Geneva, Switzerland

Apr 22-25, 2014

Moduli of curves and mathematical physics

Universiteit van Amsterdam

In occasion of the PhD Defense of Loek Spitz

Amsterdam, The Netherlands

Jan 23, 2014

Geometry and Quantum Theory Colloquium

GQT Cluster

The Netherlands

Jan 17-18, 2014

Workshop on Algebraic Cycles and Tautological classes

In occasion of the PhD Defense of Qizheng Yin

Nijmegen, The Netherlands

Dec 18, 2013

VBAC2013: Hilbert Schemes, Sheaves and Representations

SISSA

Trieste, Italy

Jun 17-21, 2013

Recent trends in Algebraic Analysis

Università di Padova

Trieste, Italy

Feb 19-23, 2013

Teaching

Curricular PhD course at SISSA: Introduction to topological recursion and moduli spaces of curves

Lecturer

SISSA, Trieste (IT), Apr-May 2022

PhD mini-course: Hurwitz theory and topological recursion

Lecturer

School TRSalento2021 (IT), Sep 2021

PhD mini-course: Hurwitz theory and enumerative geometry

Lecturer

U Nairobi (KE), Aug 2021

PhD mini-course: Moduli spaces of curves and topological recursion

Lecturer

UniSalento Lecce (IT), Jun 2021

Outreach teaching activities with SAMI (see below)

Topology, Geometry, Algebra, Probability, Physics, Programming courses

Lecturer

African maths institutes, 2016 - 2021

Wiskunde N2

Ordinary and Partial Differential Equations

Assistant

U Amsterdam (NL), Fall 16

Algebra I
GROUP THEORY

Assistant
U Amsterdam (NL), Spring 15

Wiskunde N2
ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

Assistant
U Amsterdam (NL), Fall 15

Algebra I
GROUP THEORY

Assistant
U Amsterdam (NL), Spring 15

Wiskunde N2
ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

Assistant
U Amsterdam (NL), Fall 14

Galois Theorie
GALOIS THEORY

Assistant
U Amsterdam (NL), Spring 14

Wiskunde N3
COMPLEX ANALYSIS

Assistant
U Amsterdam (NL), Fall 13

Outreach activities

I have taken up the role of Director of the UK based Charity SAMI (Supporting African Maths Initiatives, https://samicharity.co.uk) since 2019. SAMI wants to address the huge divides in terms of access and quality of education across Africa, in particular with respect to Mathematics. Since 2013 SAMI has supported activities for more than 1600 African highschool students in seven African countries thanks to more than 500 volunteers among local and international scientists.

"Crosspollination" workshop on maths education in African Institute for Mathematical Sciences of Rwanda, Kigali
ESTABLISHING A COMMUNITY OF PRACTICE WITH INTERNATIONAL MATHS EDUCATORS AT DIFFERENT LEVELS

Organiser
Spring 22

Development of an open-access maths educational online repository for local delivery in times of Covid-19 pandemic (https://virtualmathscamp.com)
LEADING THE VIDEO TEAM AND OVERALL ORGANISATION

Team leader and organiser
Summer-Fall 20

SAMI (Supporting African Mathematics Initiatives) Maths Camp Rwanda
ORGANISER OF A TWO WEEKS MATHS CAMP FOR HIGH SCHOOL STUDENTS

Main organizer
Summer 19

"Crosspollination" workshop on maths education in Africa in Cape Coast, Ghana
ESTABLISHING A COMMUNITY OF PRACTICE WITH INTERNATIONAL MATHS EDUCATORS AT DIFFERENT LEVELS

Speaker and participant
Spring 19

SAMI (Supporting African Mathematics Initiatives) Maths Camp Kenya
VOLUNTEERING IN A TWO WEEKS MATHS CAMP FOR HIGH SCHOOL STUDENTS

Co-organizer
Summer 18

SAMI (Supporting African Mathematics Initiatives) Maths Camp Ghana
VOLUNTEERING IN A TWO WEEKS MATHS CAMP FOR HIGH SCHOOL STUDENTS

Co-organizer
Summer 17

SAMI (Supporting African Mathematics Initiatives) Maths Camp Tanzania *Co-organizer*
VOLUNTEERING IN A TWO WEEKS MATHS CAMP FOR HIGH SCHOOL STUDENTS *Summer 16*

Skills

Programming	Sage, Mathematica, Matlab, C/C++, LaTeX
Languages	Italian (Mother tongue), English (C1), Spanish, French (B2), Dutch, German (B1)
Others	Judo instructor for two years, Scout educator, one-year Italian civil servant (on voluntary basis)