

# Andrea Appel

## Curriculum Vitae

Università di Parma  
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### Research Interests

Representation Theory, Mathematical Physics

### Current Employment

2023 **Associate Professor in Algebra**, *Università di Parma*, Italy

### Previous Appointments

- 2020 - 2022 **Assistant Professor (RTDb)**, *Università di Parma*, Italy  
2017 - 2020 **Research Fellow**, *University of Edinburgh*, UK  
2014 - 2017 **Assistant Professor**, *University of Southern California*, Los Angeles, USA  
2013 **Research Fellow**, *Hebrew University of Jerusalem*, Israel

### Education

#### Ph.D. in Mathematics

2013 **Northeastern University, Boston**  
Advisor: Prof. V. Toledano Laredo

#### M.Sc. in Mathematics

2008 **Sapienza Università di Roma**  
Advisor: Prof. C. De Concini.

#### B.Sc. in Mathematics

2006 **Sapienza Università di Roma**  
Advisor: Prof. M.J. de Resmini

### ASN

*Abilitazione Scientifica Nazionale* alle funzioni di professore universitario di Prima Fascia nel Settore Concorsuale 01/A2 - GEOMETRIA E ALGEBRA. Validità: 24/10/2023 - 24/10/2034.

### Active Research Group Affiliations

**INdAM**, *Istituto Nazionale di Alta Matematica*

Research Group GNSAGA - Gruppo Nazionale Strutture Algebriche, Geometriche ed Applicazioni.

**INFN**, *Istituto Nazionale di Fisica Nucleare, Gruppo Collegato di Parma*

Research Group GAST - Gauge and String Theory.

**CaLISTA**, *COST Action 2022-2026*

CA21109 - Cartan geometry, Lie, Integrable Systems, quantum group Theories for Applications.

### Preprints

- *Tensor K-matrices for quantum symmetric pairs* (with B. Vlaar).  
arXiv:2402.16676, 42pp.
- *The R-matrix of the affine Yangian* (with S. Gautam and C. Wendlandt).  
arXiv:2309.02377, 57pp.
- *Trigonometric K-matrices for finite-dimensional representations of quantum affine algebras* (with B. Vlaar).  
arXiv:2203.16503, 37pp.

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## Publications

- *Monodromy of the Casimir connection of a symmetrisable Kac–Moody algebra* (with V. Toledano Laredo). **Inventiones Mathematicae** (2024), 124pp.  
DOI:10.1007/s00222-024-01242-8. arXiv:1512.03041.
- *Pure braid group actions on category  $\mathcal{O}$  modules* (with V. Toledano Laredo). **Pure and Applied Mathematics Quarterly** (2024), 52 pp.  
To appear. arXiv:2208.05331.
- *Generalized Schur–Weyl duality for quantum affine symmetric pairs and orientifold KLR algebras* (with T. Przydzicki). **Advances in Mathematics** 435 (2023), Part B, 109383, 52pp.  
DOI:10.1016/j.aim.2023.109383 arXiv:2204.04123.
- *On a conjecture of Khoroshkin and Tolstoj* (with S. Gautam and C. Wendlandt). **International Mathematics Research Notices - IMRN**, 2023 (2023) no.24, 17pp.  
DOI:10.1093/imrn/rnac334. arXiv:2206.14857. Oberwolfach Report.
- *Universal  $K$ -matrices for quantum Kac–Moody algebras* (with B. Vlaar). **Representation Theory** 26 (2022), 61pp.  
DOI:10.1090/ert/623. arXiv:2007.09218.
- *Continuum Kac–Moody algebras* (with F. Sala and O. Schiffmann). **Moscow Mathematical Journal** 22 (2022) no.2, 48pp.  
DOI:10.17323/1609-4514-2022-22-2-177-224. arXiv:1812.08528.
- *Quantization of continuum Kac–Moody algebras* (with F. Sala). **Pure and Applied Mathematics Quarterly** 16 (2020) no.3, 55pp.  
DOI: 10.4310/PAMQ.2020.v16.n3.a5. arXiv:1903.01413.
- *An explicit isomorphisms between quantum and classical  $\mathfrak{sl}_n$*  (with S. Gautam). **Transformation Groups** 25 (2020) no.4, 36pp.  
DOI:10.1007/s00031-019-09543-6. arXiv:1712.03601.
- *Coxeter categories and quantum groups* (with V. Toledano Laredo). **Selecta Mathematica (N.S.)** 25 (2019), no.3, 97pp.  
DOI:10.1007/s00029-019-0490-y. arXiv:1610.09741.
- *Uniqueness of Coxeter structures on Kac–Moody algebras* (with V. Toledano Laredo). **Advances in Mathematics** 347 (2019), 104pp.  
DOI:10.1016/j.aim.2019.02.022. arXiv:1508.01945.
- *A 2–categorical extension of Etingof–Kazhdan quantisation* (with V. Toledano Laredo). **Selecta Mathematica (N.S.)** 24 (2018), no.4, 89pp.  
DOI:10.1007/s00029-017-0381-z. arXiv:1610.09744.
- *A  $DG$ -extension of symmetric functions arising from higher representation theory* (with I. Egilmez, M. Hogancamp, A. Lauda). **Journal of Combinatorial Algebra** 2 (2018), no.2, 45pp.  
DOI:10.4171/JCA/2-2-3. arXiv:1704.00713.

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## Other

- **Generalized Schur–Weyl dualities, quantum affine symmetric pairs, and orientifold Khovanov–Lauda–Rouquier algebras**, with T. Przydzicki  
Contribution in **Oberwolfach Report: Three Facets of R-matrices**, 17–23 October 2021  
DOI: 10.4171/OWR/2021/51
- **Quasi–Coxeter categories and a relative Etingof–Kazhdan functor**, with V. Toledano Laredo  
Superseded by the publications Sel. Math. N.S. 2018 and 2019. arXiv:1212.6720, 63pp.

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## Thesis

- **Monodromy theorems in the affine setting**, *Ph.D. Thesis*  
hdl.handle.net/2047/d20003201

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## Research Grants

- 2023-2024 **Progetto d'Ateneo Università di Parma**, *Quantum groups at root of unity and integrable systems with boundary*, Programma FIL - Bando 2022 - Partially funded by Fondazione Cariparma.  
Role: Principal investigator. Scope: Research Funds. Amount: €8,500.
- 2021-2022 **Progetto d'Ateneo Università di Parma**, *Reflection Symmetries arising from quantum loop algebras*, Programma FIL - Bando 2020 - Partially funded by Fondazione Cariparma.  
Role: Principal investigator. Scope: Research Funds. Amount: €8,500.
- 2020 **Programma per giovani ricercatori Rita Levi Montalcini 2018 (D.M. 511 - 24/8/2020)**  
Role: Principal investigator. Scope: Salary and Research Funds. Amount: €180,481.44 + €43,000.  
*Status: grant declined.* [Link](#).
- 2015-2017 **AMS-Simons Travel Grant**, *AMS-Simons Foundation*  
Role: Principal Investigator. Scope: Research Funds. Amount: \$4,000

## Research Training Grants

- 2019-2020 **IAD Action Grant**, *Institute for Academic Development, University of Edinburgh*  
Role: Coordinator. Scope: Academic projects aimed at PhD students and Postdocs. Amount: £6,500

## Fellowships

- 2014, 2017 **Visiting Fellowship**, IHES  
June-July 2014, October 2017
- 2013 **Dissertation Completion Fellowship**, Northeastern University  
01/01/2013-30/04/2013. Scope: Semester salary (4 months, research only). Amount: approx. \$18,000
- 2011 **Ling-Ma Fellowship**, Northeastern University  
01/06/2011-31/07/2011. Scope: Summer Salary (research only). Amount: approx. \$5,000
- 2008 **University Excellence Fellowship**, Northeastern University  
2008-2013. Scope: Additional research funds. Amount: \$25,000

## Visiting positions

- 2023 **Centro Internazionale per la Ricerca Matematica**, Trento, Italy  
Research in Pairs with S. Gautam and C. Wendlandt - 3 weeks
- 2021 **Mathematisches Forschungsinstitut Oberwolfach**, Germany  
Research in Pairs with S. Gautam and C. Wendlandt - 2 weeks
- 2019 **Aspen Center for Physics**, Colorado, USA  
Summer Program - 3 weeks
- 2017 **Institut des Hautes Études Scientifiques IHES**, France  
Research visit - 1 month
- 2015 **IAS Park City Mathematical Institute**, Utah, USA  
Summer Program - 3 weeks
- 2014 **Institut des Hautes Études Scientifiques IHES**, Paris, France  
Research visit - 1 month
- 2014 **Hebrew University**, Jerusalem, Israel  
Research visit - 1 months
- 2012 **Columbia University**, NY, USA  
Research visit - 4 months
- 2012 **Forschungsinstitut für Mathematik, ETH**, Zurich, Switzerland  
Research program - 1 month

## Academic Activities - Organization of conferences and workshops

- 2024 **New Perspectives in Yangians and Quantum Affine Algebras**, *Parma, Italy*, September 23-27, 2024.  
Organizers: A. Appel, C. Meneghelli.
- 2024 **Quantization in Representation Theory, Derived Algebraic Geometry, and Gauge Theory**, *SwissMAP Research Station at Les Diablerets, Switzerland*, September 15-20, 2024.  
Organizers: A. Appel, L. Bossinger, G. Felder, M. Porta, F. Sala, O. Schiffmann.

- 2021 **Quantization in Derived Algebraic Geometry and Representation Theory**, *Casa Matemática Oaxaca, Mexico*, May 2–7, 2021  
<http://www.birs.ca/events/2021/5-day-workshops/21w5145/participants>.  
 Organizers: A. Appel, M. Porta, F. Sala, O. Schiffmann. Cancelled due to Covid Emergency.
- 2019 **Quantum groups and integrable systems (56th ARTIN Meeting)**, *University of Edinburgh*, Nov. 28-29, 2019  
[www.maths.ed.ac.uk/~aappel/artin56.html](http://www.maths.ed.ac.uk/~aappel/artin56.html)  
 Organizers: A. Appel, D. Valeri
- 2016 **US–Mexico Conference in Representation Theory, Categorification, and Noncommutative algebra**, *University of Southern California, Los Angeles*, May 30 - June 3, 2016  
<http://www-bcf.usc.edu/~lauda/US-MEX-2016/conference2016.html>  
 Organizers: A. Appel, A. Lauda, C. Geiss, M. Yakimov
- 2014 **Workshop on Categorification and Representation Theory**, *University of Southern California, Los Angeles*, October 30-31, 2014  
 Organizers: A. Appel, A. Lauda, D. Rose

## Young Researchers Meetings in Algebra and Geometry

- 2024 **Young Researchers Meeting in Algebra and Geometry in Milano**, September 23-25, 2024  
 Funded by INdAM-GNSAGA, Università di Milano.  
 Organizers: A. Appel, F. Binda, L. Pertusi, F. Sala, R. Svaldi, M. Talpo
- 2023 **Young Researchers Meeting in Algebra and Geometry in Roma**, September 20-22, 2023  
 Funded by INdAM-GNSAGA, Università di Roma Tre.  
 Organizers: A. Appel, F. Binda, L. Capuano, F. Sala, M. Talpo
- 2022 **Young Researchers Meeting in Algebra and Geometry in Trieste**, September 28-30, 2022  
 Funded by INdAM-GNSAGA, SISSA, Università di Pisa.  
 Organizers: A. Appel, A. Lerario, F. Sala, S. Scherotzke, N. Sibilla, M. Talpo
- 2021 **Young Researchers Meeting in Algebra and Geometry in Pisa**, September 30 - October 1, 2021  
 Funded by INdAM-GNSAGA, Università di Pisa, Scuola Normale Superiore di Pisa, Politecnico di Milano.  
 Organizers: A. Appel, A. Hochenegger, M. Porta, F. Sala, S. Scherotzke, M. Talpo

## Conference Talks

- 2024 **Hopf algebras and Monoidal Categories**, *Università di Ferrara, Italy*  
 September 3-6, 2024. [Link](#)
- 2024 **Perspectives in Representation Theory - 9ECM Satellite Conference**, *Coimbra, Portugal*  
 July 1-3, 2023. [Link](#)
- 2023 **Taipei Conference in Representation Theory VII**, *Taipei, Taiwan*  
 December 18-22, 2023. [Link](#)
- 2023 **VI International Workshop on Non-associative Algebras**, *Universidad Politécnica de Madrid, Spain*.  
 June 19-23, 2023. [Link](#)
- 2023 **Higher structures in Caprarola**, *Italy*  
 February 15-17, 2023. [Link](#)
- 2022 **New trends in Hopf algebras and Monoidal Categories**, *Università di Torino, Italia*.  
 September 6-9, 2022. [Link](#)
- 2021 **Three facets of R-matrices**, *Mathematisches Forschungsinstitut Oberwolfach, Germany*  
 October 17-22, 2021 - [Link](#)
- 2020 **Tensor Categories, Quantum groups, and Related Topics**, *Nottingham, UK*  
 June 29 - July 1, 2020 - [Link](#)
- 2019 **Lie Theory Session, XXI Congress of the Italian Mathematical Union**, *Pavia, Italy*  
 September 2019 - [Link](#)
- 2019 **Moduli Spaces, Representation Theory and Quantization**, *RIMS, Kyoto University*  
 June 2019 - [Link](#)
- 2019 **Geometry and Mathematical Physics Workshop**, *Loughborough University*  
 March 2019 - [Link](#)

- 2019 **Representation theory, gauge theory and integrable systems**, *Kavli IPMU, Tokyo*  
February 2019 - [Link](#)
- 2019 **Aspects of Higher Representation Theory**, *Brussels, Belgium*  
January 2019 - [Link](#)
- 2017 **Conference on Geometric Representation Theory**, *University of Glasgow*  
July 2017 - [Link](#)
- 2015 **US–Mexico Conference in Representation Theory and Noncommutative algebra**, *UNAM, Mexico City*  
January 2015 - [Link](#)
- 2014 **Algebraic Geometry and Representation Theory in Rome**, *Università Roma Tre, Italy*  
December 2014
- 2014 **Second Joint International Meeting IMU–AMS, Special Session on Mirror Symmetry and Representation Theory**, *Tel Aviv University, Israel*  
June 2014 - [Link](#)
- 2014 **Quantum groups, Deformation and Geometry - A Conference in memory of J. Donin**, *Bar-Ilan University, Israel*  
June 2014 - [Link](#)
- 2013 **AMS Sectional Meeting**, *University of California Riverside*  
Novembre 2013 - [Link](#)

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## Lecture Series

- 2024 **GABY: Groups & Algebras in Bicocca for Young algebraists**, *Università di Milano Bicocca, Italy*  
June 17-21, 2024. [Link](#)

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## Seminars

- 2024 Séminaire de Mathématique, Institut Denis Poisson, Université de Tours
- 2023 Séminaire de Mathématique, IRIMAS, Université Haute-Alsace  
Integrable Systems Seminar, Beijing Institute of Mathematical Sciences and Applications  
Algebra Seminar, Università di Padova
- 2022 Physical Algebra and Combinatorics Seminar, Osaka Metropolitan University  
WAYTA Seminar, Universiteit van Amsterdam  
Algebra and Representation Theory Seminar, Università di Roma Tor Vergata  
Mathematical Physics Seminar, Purdue University  
Algebra Seminar, Newcastle University
- 2021 Seminario di Algebra e Geometria, Università dell'Aquila  
Seminario di Combinatoria, Teoria di Lie e Topologia, Università di Pisa  
Representation Theory Seminar, Ohio State University  
QGS: Quantum groups seminar
- 2020 The Anglo-Franco-German RepNet Virtual Seminar  
Seminario di Algebra e Geometria, Università di Bologna  
Seminario di Algebra e Teoria delle Rappresentazioni, Università di Roma Tor Vergata  
Séminaire AGATA, Université de Montpellier
- 2019 Geometry and Mathematical Physics Seminar, University of York  
Algebra Seminar, University of East Anglia  
Algebra Seminar, Leicester University
- 2018 Mathematics and String Theory Seminar, IPMU, University of Tokyo  
Séminaire de Physique Mathématique, UBFC, Dijon  
Representation Theory Seminar, Ohio State University  
Geometric Representation Theory, YCM, Tsinghua University  
Mathematics and String Theory Seminar, IPMU, University of Tokyo

- 2017 Quantum groups, Hopf algebras and monoidal categories, Université Catholique de Louvaine  
Algebra Seminar, University of York  
Algebra Seminar, University of Newcastle  
Séminaire quantique, IRMA – Université de Strasbourg  
Groupes, Représentations et Géométrie, Université Paris 7  
MAXIMALS, University of Edinburgh  
GLEN, University of Glasgow  
Geometric Methods in Representation Theory Seminar, University of North Carolina  
Mathematical Physics Seminar, Stony Brook University  
Representation Theory Seminar, Università di Roma Tor Vergata
- 2016 Representation Theory Seminar, University of Toronto  
Mathematical Physics Seminar, Perimeter Institute, Waterloo  
MAXIMALS, University of Edinburgh  
Representation Theory Seminar, UC Berkeley  
Algebra Seminar, UC Davis  
Algebra and Geometry Seminar, Sapienza University of Rome
- 2015 Algebra Seminar, Università di Pisa  
Algebra Seminar, UC Riverside
- 2013 Talks in Mathematical Physics, ETH, Zurich
- 2011 Incontro Natalizio, Dipartimento di Matematica, Università di Roma *La Sapienza*

## Teaching - Graduate Courses - PhD Level

### Topics in Representation Theory

Since 2022, I propose every year an advanced course (or a reading course) in Representation Theory within the framework of the Ph.D. Program of the Universities of Parma, Modena/Reggio Emilia, and Ferrara. The course is generally held online and the participation is open to graduate students from other universities.

- 2021 **Yangians in geometry and representation theory**  
Joint course with University of Pisa and University of Rome Tor Vergata.
- 2016 **Infinite-dimensional Lie groups**  
University of Southern California Los Angeles
- 2015 **Quantum groups and differential equations**  
University of Southern California Los Angeles

## Languages

Italian, English, French

## Research Profiles

- ORCID 0000-0002-6446-9305
- Scopus 57200223562
- GScholar [Link](#)