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Kasia Rejzner

Employment:

- **October 2020-present**, reader (permanent appointment), Department of Mathematics, University of York, UK.
- **April 2017-September 2020**, senior lecturer (permanent appointment), Department of Mathematics, University of York, UK.
- **October 2013-March 2017**, lecturer (permanent appointment), Department of Mathematics, University of York, UK.
- **July 2012-August 2013**, post-doc, Department of Mathematics, University of Rome Tor Vergata, Italy.
- **November 2011-June 2012**, post-doc, Department of Mathematics, University of Hamburg, Germany.
- **19 August-09 September 2009**, summer student in experimental particle physics group, LPNHE, Universités Paris VI et Paris VII, Paris.
- **July-August 2008**, summer student in experimental particle physics group, CERN, Geneve.

Qualifications:

- **2013-2015**, completed PGCAP (Postgraduate Certificate in Academic Practice), University of York, UK.
- **October 2011**, Ph.D. in physics, completed within 2 years, with distinction (supervisor: K. Fredenhagen), University of Hamburg, Germany.
- **June 2009**, M.Sc. in physics, with distinction, Jagiellonian University in Cracow, Poland.

Research

I am a mathematical physicist and my research concerns mathematical aspects of quantum field theory (QFT), with a particular focus on understanding interactions between quantum theory and gravitation.

Publications

In mathematical physics publications, the order of authors is always *alphabetical*. In all my publications with joint authorship, I was an equal contributor.

(i) Books

- K. Rejzner, *Perturbative algebraic quantum field theory. An introduction for mathematicians*, Springer, 2016.

(ii) Chapters in books

- K. Fredenhagen, K. Rejzner, *Local covariance and background independence*, book chapter in *Quantum Field Theory and Gravity: Conceptual and Mathematical Advances in the Search for a Unified Framework*, F. Finster, O. Müller, M. Nardmann, J. Tolksdorf, E. Zeidler, (Eds.), Birkhäuser, 2012.

- K. Fredenhagen, K. Rejzner, *Perturbative algebraic quantum field theory*, book chapter in *Mathematical Aspects of Quantum Field Theories*, D. Calaque, T. Strobl (Eds.), Springer, 2015.

- K. Fredenhagen, K. Rejzner, *Perturbative Construction of Models of Algebraic Quantum Field Theory*, book chapter in *Advances in Algebraic Quantum Field Theory*, R. Brunetti, C. Dappiaggi, K. Fredenhagen, J. Yngvason (Eds.), Springer, 2015.

(iii) Articles in journals.

- K. Rejzner, *Fermionic fields in the functional approach to classical field theory*, Rev. Math. Phys. **23** (2011) 1009-1033.

- A. Herdegen, K. Rejzner, *Spacelike localization of long-range fields in a model of asymptotic electrodynamics*, Annales Henri Poincaré **12** (2011) 1387-1415.

- K. Fredenhagen, K. Rejzner, *Batalin-Vilkovisky formalism in the functional approach to classical field theory*, Commun. Math. Phys. **314** (2012) 93-127.

- K. Fredenhagen, K. Rejzner, *Batalin-Vilkovisky formalism in perturbative algebraic quantum field theory*, Commun. Math. Phys. **317** (2013), 697-725.

- R. Brunetti, M. Dütsch, K. Fredenhagen, K. Keller, K. Rejzner, *Dimensional Regularization in Position Space, and a Forest Formula for Epstein-Glaser Renormalization*, J.Math.Phys. **55** (2014), 122303.

- R. Brunetti, K. Fredenhagen, P. Imani, K. Rejzner, *The Locality Axiom in Quantum Field Theory and Tensor Products of C^*-algebras*, Rev. Math. Phys. **26** (2014) 1450010.

- D. Bahns, K. Rejzner, J. Zahn, *The effective theory of strings*, Commun. Math. Phys. **327** (2014) 779-814.

- K. Rejzner, *Remarks on local symmetry invariance in perturbative algebraic quantum field theory*, Annales Henri Poincaré **16** (2015), 205-238.

- K. Fredenhagen, K. Rejzner, *QFT on curved spacetimes: axiomatic framework and examples*, J.Math.Phys. **57** (2016), 031101.

- R. Brunetti, K. Fredenhagen, K. Rejzner, *Quantum gravity from the point of view of locally covariant quantum field theory*, Commun. Math. Phys. **345** (2016), 741-779, DOI: `10.1007/s00220-016-2676-x`.

- R. Brunetti, K. Fredenhagen, N. Pinamonti, T.-P. Hack, K. Rejzner, *Cosmological perturbation theory and quantum gravity*, JHEP **1608** (2016) 032.

- D. Bahns, K. Rejzner, *The Quantum Sine Gordon model in perturbative AQFT*, Commun. Math. Phys. **357** (2018) no.1, 421.

- C. Brouder, N. V. Dang, C. Laurent-Gengoux and K. Rejzner, *Properties of field functionals and characterization of local functionals*, J. Math. Phys. **59** (2018) no.2, 023508.

- O. Gwilliam, K. Rejzner, *Relating nets and factorization algebras of observables: free field theories*, Commun. Math. Phys. **373** (2020), 107-174.

- E. Hawkins, K. Rejzner, *The Star Product in Interacting Quantum Field Theory*, Letters in Mathematical Physics **110** (2020), 1257-1313.

- E. Dable-Heath, C.J. Fewster, K. Rejzner, N. Woods, *Algebraic Classical and Quantum Field Theory on Causal Sets*, Phys. Rev. D **101** (2020) 065013.
- D. Bahns, K. Fredenhagen, K. Rejzner, *Local nets of von Neumann algebras in the Sine-Gordon model*, 2017, [arXiv:math-ph/1712.02844], accepted for publication in Commun. Math. Phys.

(iv) Papers published in refereed conference proceedings

- F. Fayette, M. W. Krasny, W. Placzek, K. Rejzner, A. Siódmok, *A strategy for precision measurements of the W-boson mass and width at the LHC*, PoS (2009) 095, proceedings of the conference HCP 2009, 16-20 November 2009.
- K. Rejzner, *Perturbative algebraic QFT as a universal framework for constructing physically motivated models in quantum field theory*, PoS(FFP14)147, proceedings of the conference Frontiers of Fundamental Physics 14, Marseille, July 15-18, 2014.
- K. Rejzner, *Renormalization and periods in perturbative Algebraic Quantum Field Theory*, in July 2019 accepted for publication in the proceedings volume for the conference *Periods in Quantum Field Theory and Arithmetic*, Madrid (Spain) 2014, J.I. Burgos Gil, K. Ebrahimi-Fard, H. Gangl (eds.).
- C.J. Fewster, K. Rejzner, *Algebraic Quantum Field Theory – An introduction*, 2019, accepted for publication in *Progress and Visions in Quantum Theory in View of Gravity*, Finster, F., Giulini, D., Kleiner, J. & Tolksdorf, J. (eds.).
- K. Rejzner, *Locality and causality in perturbative AQFT*, 2019, [arXiv:math-ph/1906.02326], accepted for publication in Journal of Mathematical Physics, in proceedings volume for the ICMP 2018.

(v) Preprints

- K. Rejzner, *Batalin-Vilkovisky formalism in locally covariant field theory*, Ph.D. thesis, DESY-THESIS-2011-041, Hamburg, 2011.
- K. Rejzner, M. Schiavina, *Asymptotic symmetries in the BV-BFV formalism*, [arXiv:2002.09957].
- K. Rejzner, *BV quantization in perturbative algebraic QFT: Fundamental concepts and perspectives*, [arXiv:2004.14272].

(vi) Editorial duties

2020-present Associate Editor in *Mathematical Physics, Analysis and Geometry* journal (Springer).

2021-present Editor of the book series *Theoretical and Mathematical Physics* (Springer).

Research Funding

- K. Rejzner, 2012-2013, "incoming type" grant of the INdAM-COFUND, a fellowship of Istituto Nazionale di Alta Matematica "F. Severi" funded by **Marie Curie Actions**.

- K. Rejzner, 2015-2016, Emmy Noether fellowship, granted by the **Perimeter Institute**.

- K. Rejzner, M. Benini, A. Schenkel, Ch. Schweigert, December 2016, funding for an **MFO** (Mathematisches Forschungsinstitut Oberwolfach) mini-workshop *New interactions between homotopical algebra and quantum field theory* (duration of one week, for about 16 participants with full accommodation and subsistence costs covered).

- K. Rejzner, G. Honecker, S. Paycha, K. Wendland, March 2017, funding for a **MITP** (Mainz Institute for Theoretical Physics) workshop *Women at the Intersection of Mathematics and High Energy Physics* (duration of one week, for about 20 participants).

- K. Rejzner, **EPSRC (Engineering and Physical Sciences Research Counci, UK)Starting Grant**, 24 months from September 2017, total value of 78,543 GBP.

- K. Rejzner, 2018-2020, visiting fellowship, granted by the **Perimeter Institute**.

- K. Rejzner, A. Alekseev, X. de la Ossa, S. Paycha, S. Reffert, A. Taormina, March 2019, funding from **SwissMap** (*National Centre of Competence in Research NCCR SwissMAP - The Mathematics of Physics* is an interdisciplinary research center at the crossroads of mathematics and theoretical physics, funded by the Swiss National Science Foundation) for a conference *Women at the Intersection of Mathematics and High Energy Physics* (duration of 3 days, for about 25 participants, including 14 speakers with full accommodation and travel costs covered), took place in November 2019.

- K. Rejzner, B. Dittrich, S. Surya, funding from the **Perimeter Institute** and **Simons Foundation**, approved on the 17th of April 2019, for *Emmy Noether Workshop: The Structure of Quantum Spacetime* (duration of 5 days, for 38 participants, including 22 invited speakers with full accommodation and travel costs covered), to take place in February 2021.

- K. Rejzner, B. Dittrich, T. Johnson-Freyd, S. Paycha, A. Taormina, R. Toriumi, funding from the **Perimeter Institute**, approved on the 25th of September 2019, for the conference *Women at the Intersection of Mathematics and Theoretical Physics* (duration of 5 days, for 47 participants, including 23 invited speakers/organizers with full accommodation and travel costs covered).

Research Students

- Francis Wingham, **graduated in July 2019**, started in October 2014, **main supervisor**.

- Michael Kiss, **Ph.D. thesis submitted, viva took place in December 2021**, started in October 2015, **co-supervisor**.

- Christoph Minz, **current Ph.D. student**, started in October 2017, **main supervisor**.

- Samuel Crawford, **current Ph.D. student**, started in October 2018, **main supervisor**.

- Berend Visser, **current Ph.D. student**, started in October 2020, **main supervisor**.

Other research activities and distinctions

(i) Conference and workshop talks

Plenary conference talks: (date, name of the conference, place, title of the talk)

2015   **12-16 July**, *XIV Marcel Grossmann Meeting*, Rome, Italy, "Effective quantum gravity from the point of view of perturbative algebraic QFT".

2016   **25 July**, *Classical and Quantum Symmetries in Mathematics and Physics*, Jena, Germany, "BV quantization on Lorentzian manifolds and applications in perturbative quantum gravity".

2017   **5 May**, *Manchester SIAM-IMA Student Chapter Conference*, Manchester, UK, " Mathematics of Black Holes and the Big Bang".

2018   **20-23 March**, *DPG Frühjahrstagung 2018*, Würzburg, Germany, plenary symposium talk (Hauptvortrag): "From QFT on curved spacetimes to effective quantum gravity".

Other invited conference talks since 2016 (out of **38** total)

2016   **10-13 February**, *Paths to, from and in renormalisation*, Potsdam, Germany, "Epstein-Glaser Renormalization on Curved Spacetimes: Algebraic Structures and Analytic Properties".

8-14 May, *Factorization Algebras and Functorial Field Theories*, Oberwolfach workshop, MFO, Germany, "BV algebras in causal QFT".

22-27 May, *Renormalization Group*, Oberwolfach workshop, MFO, Germany, "Renormalization on Lorentzian manifolds in pAQFT".

26-27 September, *Local Quantum Physics and beyond - in memoriam Rudolf Haag*, Hamburg, Germany, "Locality and beyond: from algebraic quantum field theory to effective quantum gravity."

2017   **4-7 April**, *Quantum Field Theory: Concepts, Constructions & Curved Spacetimes*, York, UK, "Convergence of the Epstein-Glaser S-matrix in the Sine-Gordon model."

8-15 May, *Quantum Field Theory on Manifolds with Boundary and the BV Formalism*, Perimeter Institute, Waterloo, Canada, "Building bridges between Lorentzian and Euclidean formalisms for BV quantization."

29 May-2 June, *Foundational and structural aspects of gauge theories*, MITP, Mainz, Germany, "BV formalism in functorial QFT in Lorentzian and Euclidean signature."

24-28 July, *String Math 2017*, Hamburg, Germany, "New perspective on Sine-Gordon model and perturbative QFT."

11-15 September, *Mathematical Questions and Challenges in Quantum Electrodynamics and its Applications*, Oberwolfach workshop, MFO, Germany, "Interacting models in perturbative AQFT".

26-27 October, *Quantum Investigations: A Conference in Honour of Miklós Rédei*, LSE, London, UK, "From perturbation theory to rigorous axioms: modern paradigm for studying foundations of QFT."

26 November - 01 December, *Reflection Positivity*, Oberwolfach workshop, MFO, Germany, "Local nets of von Neumann algebras in the sine-Gordon model."

2018   **9-12 April**, *Women at the intersection of Mathematics and High Energy Physics*, Hamburg, Germany, "Mathematical structures in quantum field theory: from axioms to Feynman graphs and back."

1-2 June, *ICFT 22: Meeting on Integrable and Conformal Field Theory and Related Topics*, Cardiff, United Kingdom, "Sine Gordon model from the perspective of perturbative algebraic quantum field theory."

3-8 June, *Algebraic Quantum Field Theory: Where Operator Algebra meets Microlocal Analysis*, Cortona, Italy, "Convergence in the perturbative AQFT framework: recent results and perspectives."

23-28 July, *International Congress on Mathematical Physics 2018*, Montreal, Canada, "Perturbative algebraic quantum field theory: Where we are."

29 July - 3 August, *Banff workshop: Physics and Mathematics of Quantum Field Theory*, Banff International Research Station for Mathematical Innovation and Discovery, Banff, Canada, "BV quantization in perturbative algebraic quantum field theory: gauge theories and effective quantum gravity."

5-6 October, *The Philosophy and Physics of Noether's Theorems*, University of Notre Dame (London Campus), UK, "From Noether theorems to BV quantization and beyond."

22-26 October, *Quantum field theory, renormalisation and stochastic partial differential equations*, INI, Cambridge, UK, "Renormalized quantum BV operator and observables in gauge theories and gravity."

2019 **18-22 March**, *Quantum gravity and quantum information*, CERN, Geneva, Switzerland, "Observables in quantum gravity."

20-24 May, Simons Center workshop *String field theory, BV quantization, and moduli spaces*, Simons Center for Geometry and Physics, Stony Brook, USA, "BV formalism in causal quantum field theory".

17-21 June, Simons Center workshop *Operator Algebras and Applications*, Simons Center for Geometry and Physics, Stony Brook, USA, "Constructing the net of von Neumann algebras for the sine-Gordon model".

23-27 July, OIST workshop *Quantum gravity in Okinawa*, OIST, Okinawa, Japan, "Non-locality and observables in quantum gravity."

2020 **May-June**, *Scattering, microlocal analysis and renormalisation*, Mittag-Leffler Institute (workshop replaced by a series of on-line seminars), "Symmetries and locality in perturbative algebraic quantum field theory."

22-26 June, *Gauge summer with BV*, Scalea (on-line workshop), "Asymptotic structure of quantum electrodynamics from the BV-BFV perspective."

12-16 October, *Higher Structures Emerging from Renormalisation*, ESI (on-line workshop), "A geometrical interpretation of Unitary Master Ward Identity."

12-16 October, *Quantum Spacetime and the Renormalization group*, CP3-Origins (on-line workshop), "Algebraic quantum field theory on causal sets: what have we learnt?"

2021 **13-14 January**, *Directions in quantum gravity*, on-line conference hosted by the Centre for Cosmology and Particle Physics Phenomenology at the University of Southern Denmark (SDU) in Odense, "Algebraic QFT on causal sets."

17 March, talk at *Relativistic Quantum Information - Online conference - RQI-Online 2020/21*, on the topic "Locality and causality in quantum field theory."

Contributed conference talks since 2016 (out of **26** total)

2017 **12-16 June**, *Subfactors, K-theory and conformal field theory*, INI, Cambridge, UK, "The Quantum Sine-Gordon model in perturbative AQFT."

2019 **17-21 June**, Simons Center workshop *Operator Algebras and Applications*, Simons Center for Geometry and Physics, Stony Brook, USA, "Constructing the net of von Neumann algebras for the sine-Gordon model".

Discussions and panels (out of **26** total)

2020 **13-17 July**, *Quantum Gravity 2020*, Perimeter institute (on-line conference), chaired a discussion *Lorentzian vs. Euclidean Quantum Gravit* and co-chaired a panel discussion *Time in Quantum Gravity*.

12-16 October, *Higher Structures Emerging from Renormalisation*, panelist in discussion *What is renormalisation? What next?*

12-16 October, *Quantum Spacetime and the Renormalization group*, CP3-Origins (on-line workshop), panelist in discussion *Future of Asymptotically Safe Gravity*, chairing discussion *Lorentzian signature*.

(ii) Visiting research posts and invited lectures

Invited research visits:

2015 **5-20 September**, participant at the thematic program *Modern Theory of wave equations*, ESI (Erwin Schrödinger Institute), Vienna, Austria.

2016 **12-24 March**, visitor at the Perimeter Institute, Waterloo, Canada.

11 June-16 July, visitor at the Perimeter Institute, Waterloo, Canada.

26-30 July, participant at the workshop *Recent Mathematical Developments in Quantum Field Theory*, MFO, Oberwolfach, Germany.

28 August – 17 September 2016, visitor during the trimester program *Mathematical Physics at the Crossroads* at INFN Frascati. During the visit I gave a talk on the **12th of September** on the topic *New perspectives in effective quantum gravity and cosmological perturbation theory.*

2 October-17 December, visitor at the Perimeter Institute, Waterloo, Canada.

2017 **9-14 April, 22-25 April, 11-16 June**, participant at the Newton Institute Program *Operator algebras: subfactors and their applications.*

7 November-21 November, visitor at the Perimeter Institute, Waterloo, Canada.

2018 **4-13 January** and **25-30 March**, visitor at the Max Planck Institute for Mathematics, Bonn, Germany.

1 July-31 August, visitor at the Perimeter Institute, Waterloo, Canada.

2-31 September, Simons visiting fellowship at CRM (Centre for Mathematical Research), University of Montreal, Canada.

3 November-16 December, visitor at the Perimeter Institute, Waterloo, Canada.

2019 **2-15 April**, visitor at the Perimeter Institute, Waterloo, Canada.

2-8 June, participation in the MITP Program *The Mysterious Universe: Dark Matter-Dark Energy-Cosmic Magnetic Fields*, Mainz, Germany. Talk given on the **3rd of June**: *Observables in perturbative quantum gravity and perturbative quantum cosmology*

16-26 June, participation in the Simons Center program *Operator Algebras and Quantum Physics*, Simons Center for Geometry and Physics, Stony Brook, USA.

14 July - 7 September, visitor at the Perimeter Institute, Waterloo, Canada.

11-13 September, participant at the workshop *Many-Body Quantum Systems*, Oberwolfach workshop, MFO, Oberwolfach, Germany.

20 October - 17 December, visitor at the Perimeter Institute, Waterloo, Canada.

2020 **5-12 January**, visitor at the Perimeter Institute, Waterloo, Canada.

3 August-25 September, on-line participation in the thematic program *Higher Structures and Field Theory*, ESI (Erwin Schödinger Institute), Vienna, Austria. Talk given on the **8th of September**: *Asymptotic fields in QFT from the point of view of BV-BFV formalism*

Invited lecture series:

2014 **9-10 April**, 2 lectures (4h), *Introduction into pAQFT*, University of Nottingham, UK.

9-14 June, lecture series (15h), *BV formlism*, Claude Bernard University, Lyon, France.

2015 **22-26 June**, lecture series (15h), *Quantum gravity from the point of view of parturbative algebraic quantum field theory*, IHP (The Henri Poincaré Institute), Paris, France.

2017 **7-9 June**, lecture series (3h), *Construction of models in the framework of perturbative algebraic QFT* at Journées de Physique Mathèmatique Lyon: Quantum Field Theories on Curved Space-Times, Lyon, France.

2019 **30 December 2018 - 11 January 2019**, lecture series (4h) on the topic: *Introduction to alegbraic quantum field theory*, Raman Research Institute, Bangalore, India.

Invited seminar talks since 2016 (out of **56** total)

2016 **16 February**, *Functional analytic aspects of renormalization on Lorentzian manifolds*, analysis seminar, Glasgow, UK.

7 April, *Pertubative QFT*, ZMP (Center for Mathematical Physics) seminar, Hamburg, Germany.

30 May, *Gauge invariant observable in effective quantum gravity and cosmology*, Nijmegen, The Netherlands.

2017   **28 February**, *Mathematical structures in QFT: between functional analysis and geometry*, DAMTP, Cambridge, UK.

24 May, *Mathematical quantum field theory: from analysis to homological algebra*, pure mathematics colloquium, University of Sheffield, UK.

24 October, *Convergence and new perspectives in perturbative algebraic quantum field theory*, quantum field theory seminar, Oxford University, UK.

13 November, *Nets vs. factorization algebras: lessons from the comparison*, mathematical physics seminar, Perimeter Institute, Waterloo, Canada.

5 December, *Algebraic QFT on curved spacetimes: observables, states and interactions*, theory group seminar in the Department of Physics at the Imperial College London, UK.

13 December, *Approaching quantum gravity from the perturbative QFT perspective*, quantum gravity seminar at the Institute for Theoretical Physics, University of Heidelberg, Germany.

2018   **15 February**, *From perturbation theory to rigorous axioms in quantum field theory*, Geometry, Topology and Mathematical Physics seminar, University of Manchester, UK.

6 April, *Mathematical perspective on perturbative QFT*, Field Theory Seminar, Physics Institute at the Jagiellonian University, Cracow, Poland.

22 May, *BV quantization in perturbative algebraic quantum field theory: recent results and perspectives*, University of Zürich, Switzerland.

7 September, *Mathematical challenges in constructing quantum field theory models*, Colloque des Sciences Mathématiques du Québec, Montreal, Canada.

4 October, *Locality in perturbative algebraic quantum field theory*, Analysis Seminar, University of Potsdam, Germany.

12 October, *From perturbation theory to operator algebras: the example of sine-Gordon model*, Integrable Systems seminar, University of Leeds, United Kingdom.

16 October, *Construction of models in perturbative algebraic quantum field theory*, Mathematical Physics seminar, University of Genova, Italy.

2019   **18 January**, *Perturbative algebraic quantum field theory: results and perspectives*, Duram HEP seminar, Department of Mathematics, University of Durham, UK.

31 January, *BV quantization in perturbative AQFT: Results and perspectives*, geometry and topology seminar, Department of Mathematics, University of Manchester, UK.

1 April, *Locality and its generalizations in quantum field theory and gravity*, seminar "Géométrie et Quantification", IHP, Pars, France.

8 May, *Perturbative algebraic QFT - Example of the sine-Gordon model*, mathematical physics seminar, Sheffield, UK.

15 May, *BV formalism in Lorentzian and Euclidean QFT*, mathematical physics seminar, Nottingham, UK.

2 October, *Perturbative algebraic quantum field theory – A new paradigm for perturbative QFT*, "Strings, CFT & Integrability" seminar, ETH Zürich, Switzerland.

7 October, *Quantum fields on spaces with causality*, CP3-Origins seminar, University of Southern Denmark, Odense, Denmark.

18 October, *Observables of the sine-Gordon model in perturbative AQFT*, analysis seminar, AEI, Potsdam, Germany.

2020   **8 January**, *Observables and non-locality in perturbative algebraic QFT*, Colloquium talk at the Perimeter Institute, Waterloo, Canada.

24 April, *From time-ordered products in quantum field theory to factorization algebras and back*, on-line seminar Algebra, Combinatorics and Applications (Trondheim).

12 June, *BV formalism in mathematical QFT* on-line seminar (Leeds).

6 November, *Algebraic structures in perturbative AQFT* on-line seminar, seminar series *Deformationsquantisierung*, University of Würzburg, Germany.

24 November, *Symmetries and Master Ward Identity in perturbative Algebraic QFT* on-line seminar, Quantum Field Theory Seminar, University of Oxford, UK.

2 December, *BV-BFV formalism and asymptotic structure of QED* on-line seminar, Mathematical Physics Group seminar series, Heriot-Watt University and the University of Edinburgh, Edinburgh, UK.

5 and 12 January, *BV formalism - in perturbative algebraic QFT and using factorisation algebras: parts 1 and 2* on-line seminar, group research seminar in algebra and mathematical physics, Department of Mathematics, University of Hamburg, Germany.

11 January, *BV-BFV formalism in perturbative AQFT* on-line seminar, "Heidelberg-Munich-Vienna seminar on mathematical physics" series.

18 January, *Non-local observables in quantum gravity from the algebraic QFT perspective* on-line seminar, "Quantum Gravity Across Approaches" series.

10 February, *Non-local observables in quantum gravity from the algebraic QFT perspective* on-line seminar, Dublin Institute for Advanced Studies (DIAS) seminar series.

(iii) Symposia/conference organisation.

2012 **26-28 September**, co-organizing the Hausdorff Institute (HIM) Workshop *Algebraic Quantum Field Theory and Local Symmetries*, Bonn, Germany.

2016 **16-18 July**, member of the program committee of the international conference *Foundations 2016*, LSE (London School of Economics), London, UK.

7-8 December, main organizer of the workshop *Infrared Problems in QED and Quantum Gravity*, Perimeter Institute, Waterloo, Canada.

18-23 December, one of the organizers of the MFO mini-workshop *New interactions between homotopical algebra and quantum field theory*, MFO, Oberwolfach, Germany.

2017 **6-10 March**, one of the organizers of the workshop *Women at the Intersection of Mathematics and High Energy Physics*, Mainz Institute for Theoretical Physics (MITP), Mainz, Germany.

5-7 September, organizer of the international, EPSRC-funded, workshop *Modern Mathematics of Quantum Theory*, University of York, York, UK.

8-9 December, organizer of the international workshop *Quantum Physics meets Mathematics - a workshop on the occasion of Klaus Fredenhagen's 70th birthday*, Hamburg, Germany.

2019 **18-20 February**, one of the organizers of the workshop *Women at the Intersection of Mathematics and High Energy Physics 2019*, Geneva, Switzerland.

1-5 July, organizer of the international, EPSRC-funded, workshop *Mathematics of Interacting Quantum Field Theory Models*, University of York, York, UK.

18-22 November, one of the organizers of the Simons Emmy Noether Workshop: *The structure of quantum spacetime*.

2021 **22-25 February**, the main organizer organizers of the on-line workshop: *Women at the Intersection of Mathematics and Theoretical Physics*, hosted at the Perimeter Institute, Canada.

(iv) Invitations to referee for peer-reviewed journals

- Communications in Mathematical Physics (1-2 papers per year)
- Letters in Mathematical Physics (1-2 papers per year)
- Annales Henri Poinncaré (1-2 papers per year), including a review for the AHP-Birkhäuser Prize for the best paper in the year 2018
- Classical and Quantum Gravity (1-2 papers per year)

(v) Consulting or acting as a reviewer for national/international research bodies

2018 Reviewed a proposal for DFG (German Research Foundation).

2020 Member of an on-site review panel for a CRC (Collaborative Research Centre) application to DFG.

2020 Reviewed a proposal for DAAD (German Academic Exchange Service) post-doctoral fellowship.

2021 Reviewed proposals for NSERC (Natural Sciences and Engineering Research Council, Canada) and DFG.

2021 Reviewed proposals for UKRI.

(vi) Memberships

2011-present, Deutsche Physikalische Gesellschaft (DPG, German Physicists Association).

2012-present, IAMP (International Association of Mathematical Physics).

2015-present, fellow of the Higher Education Academy.

2016-present, LMS (London Mathematical Society).

2017-present, Polish Society on Relativity.

TEACHING AND SUPERVISION

Courses taught

- **2013**, **QFT on curved spacetimes: axiomatic framework and applications**, a mini-course for Ph.D. students in mathematics, summer semester, University of Rome "Tor Vergata".
- **2013-2017**, **Classical Mechanics**, Year 2 undergraduate module in mathematics extending over 2 terms, University of York, 50-80 students. I also re-designed the curriculum for that module, which used to be very unpopular among students.
- **2018-present**, **Classical and Quantum Dynamics** (C&QD), Year 2 undergraduate module in mathematics extending over 2 terms, University of York, about 100 students in Classical Dynamics and 80 in Classical and Quantum Dynamics (the module is split into two parts and some students take only the first part).
- **2020-present**, **Advanced Quantum Field Theory**, Year 4 postgraduate module in mathematics, 3 weeks of lectures, University of York, about 10 students.

Supervision and support for students' learning

- **2011/12**, co-supervised a masters student (Master Programme in Mathematical Physics), University of Hamburg.
- **2013/14**, supervised a BSc (Bachelor in Mathematics)project, University of York.

- **2014/15**, supervised a BSc project and an MMath (Master in Mathematics) project, University of York.
- **2015/16**, supervised 6 BSc projects and an MMath Group Project (3rd year MMath module, the group consisted of 4 students), University of York.
- **summer 2016**, supervised a summer student (funded by EPSRC), University of York.
- **2016/17**, supervised 5 BSc projects and an MMath project, University of York.
- **2018/19**, supervised 2 BSc projects, University of York.
- **2019/20**, supervised 3 BSc and 1 MMath project, University of York.
- **2019/20**, co-supervised a PSI (masters program) thesis at the Perimeter Institute.
- **2020/21**, supervising 3 BSc projects , University of York.

Continuing professional development and reflective practice

- **2013-2015**, completed PGCAP (Postgraduate Certificate in Academic Practice). This is a professional development course offered by the University of York, consisting of workshops and assessments spread over two years, aiming at developing good teaching practice.
- **20 September 2017**, attended the MHFA (Mental Health First Aid) Lite course. This course raises awareness of common mental health issues.
- **2 November 2017**, participation in the Learning and Teaching Forum workshop: *Embedding employability into teaching: The Sociology experience*, University of York.

Teaching awards and other distinctions

2015 Nominated for the Departmental Teaching Awards in the categories: *Supervisor of the Year*, *Inspirational Lecturer*, *Departmental Excellence in Learning and Teaching Award (DELTA)* Nominated for the YUSU (York University Student Union) Excellence Award in the category *Teacher of the Year*.

2016 Nominated for the *YUSU Excellence Award* for the *Supervisor of the Year* category.

2016 Received the *YUSU Excellence Award* for Promoting Employability.

2020 Received *Departmental Excellence in Learning and Teaching Award* (DELTA), awarded by the Department of Mathematics, University of York.

ACADEMIC CITZENSHIP

Departmental activities

(i) **Administrative roles in the department.**

- **2013-2016**, *Mathematics Facilitator* for Natural Sciences and *Head of the Chemistry/Mathematics/Physics Pathway Program Committee.*
- **June 2015-August 2018**, *Careers and Employability Coordinator.*
- **September 2020-present**, *Director of Admissions (Mathematics).*

(ii) **Active involvement in formal general activities.**

- **2014-2016**, conducting undergraduate student admission interviews for the Natural Sciences degree.

- **2013-present**, conducting undergraduate student admission interviews during Undergraduate Visit Days at the Department of Mathematics.
- **2016-present**, peer reviewing grant applications, as a part of the internal peer-review process in the Mathematics Department.

External engagement

(i) Outreach

- **9 June 2017**, leading a session: *Throwing sticks to find pi*, during the outreach event *Maths: unlocking the world around us* aimed at school children.
- **8 June 2018**, leading a session: *Throwing sticks to find pi*, during the outreach event *Maths: unlocking the world around us* aimed at school children, with the focus on girls schools, to support the initiative for more women in STEM subjects.

(ii) Serving as an officer of an international learned society

- **1 January 2021 - 31 December 2023**, elected member of the Executive Committee of International Association of Mathematical Physics (IAMP).

Other forms of service and outreach

- **July 2016 - present.** I am among 13 female mathematicians portrayed in the exhibition project *Women of mathematics throughout Europe: a gallery of portraits*

  http://womeninmath.net/protagonist/kasia-rejzner/

  The opening of the photograph exhibition took place on the 20th of July 2016 during the 7th European Congress in Mathematics. The aim of the projects is to encourage more women to pursue career in Mathematics by providing them with role models. The exhibition has since then been shown in numerous universities and institutes around the world. For example, in 2019 the list of venues is: Barcelona (Spain), Gothenburg (Sweden), Berlin (Germany), Chennai (India), Canberra (Australia), Bordeaux (France) Valparaiso (Chile), Geneve (Switzerland), Tokyo (Japan), Rennes (France), Bratislava (Slovakia), Canberra (Australia), Maastricht (The Netherlands), Montpellier (France), Paris (France), Konya (Turkey), Louvain-La-Neuve (Belgium), Camerino (Italy), Paris (France), Oslo (Norway), Sydney (Australia), Nijmegen (The Netherlands), L'Aquila (Italy), Leiden (The Netherlands), Bogotá 5 (Colombia), Sydney (Australia), Melbourne (Australia), Tokyo (Japan).

  The full list of venues can be found here: http://womeninmath.net/all-locations/

- **27 January 2016**, public lecture at the MathSoc (Student Maths Society) Seminar (aimed at UG students), *Mysterious Beginnings of Everything*.

- **2 February 2017**, popular science lecture for Natural Science UG students at the University of York, *From quantum field theory to Quantum Gravity and the Big Bang*.

- **16 February 2018**, popular science lecture for the Archimedeans (student mathematics society) at the University of Cambridge, *Mathematics at the intersection of quantum and gravity*.

- **29 November 2018**, acted as a mentor during the FemPhys mentoring night at the Perimeter Institute.

- **February 2019**, I contributed for the project related to the exhibition *Women of mathematics throughout Europe* organized in the Iqbal Masih school in Saint Denis (a suburb North of Paris) with 12 years old school children The project started on the 20th of February with the school children visiting the exhibition, where they were given an opportunity to send their questions

to the mathematicians features in the project. The questions together with the answers can be found here: http://womeninmath.net/venue/saint-denisparis-france/

- **20 November 2019**, acted as a mentor during the FemPhys mentoring night at the Perimeter Institute.

- **14 December 2020**, mentor at an on-line mentoring event organized by the University of Hamburg.

- **3 March 2021**, acted as a mentor during the FemPhys on-line mentoring night.