# Milán Mosonyi - Curriculum Vitae

#### Personal information

Born: 1976, Budapest, Hungary Nationality: Hungarian

#### Education

2005: PhD in Physics, Catholic University of Leuven Supervisors: Prof. Mark Fannes and Prof. Dénes Petz Thesis: Entropy, Information and Structure of Composite Quantum States
2004: MSc in Physics, Budapest University of Technology and Economics (BME)
2000: MSc in Mathematics, Eötvös Loránd University of Sciences, Budapest (ELTE)

#### **Employment history**

#### **Faculty positions**

| 2012 - | Associate Professor at | the Department | of Analysis, BME |
|--------|------------------------|----------------|------------------|
|--------|------------------------|----------------|------------------|

2005 - 2012 Assistant Professor at the Department of Analysis, BME

#### Research positions (on leave from BME)

| 2023 - 2024 | Visiting Research Fellow, Alfréd Rényi Institute of Mathematics, Budapest                |
|-------------|--|
| 2015 - 2016 | Postdoctoral Research Fellow, Technische Universität München (TUM)                       |
| 2013 - 2015 | Postdoctoral Research Fellow, Universitat Autònoma de Barcelona                          |
| 2011 -2013  | Marie Curie Research Fellow at the School of Mathematics, University of Bristol          |
| 2009 - 2011 | Research Fellow at the Centre for Quantum Technologies, National University of Singapore |
| 2009        | Junior Research Fellow, Erwin Schrödinger Institute for Mathematical Physics (3 months)  |
| 2006 -2008  | JSPS Postdoctoral Research Fellow, Tohoku University, Sendai, Japan                      |
| 2006        | Junior Research Fellow, Erwin Schrödinger Institute for Mathematical Physics (3 months)  |

## Extended research visits

- Participant at the topical semester "Mathematical Challenges in Quantum Information", Newton Institute, Cambridge, in 2013; 2 weeks
- Tohoku University, Sendai, Japan, in 2006, 2009, 2010, 2011, 2017, 2018; 1 month each; hosted by Prof. Fumio Hiai
- Invited participant at the topical semester on Quantum Information Theory, Mittag-Leffler Institute, Stockholm, in 2010; 1.5 months
- Visiting Postdoctoral Fellow at the Fields Institute, Toronto, in 2009; 1 month
- Mathematical Institute, University of Wroclaw, in 2006, 1 month; hosted by Prof. Marek Bozejko
- Tufts University, Boston, in 2003; 2 weeks; hosted by Prof. Mary Beth Ruskai
- Visiting Scholar at the Institute for Theoretical Physics, Catholic University of Leuven in 2002; 3 months; hosted by Prof. Mark Fannes

## Awards, grants

## PI of grants with multiple participants

- Hungarian National Research, Development and Innovation Office (NKFIH) grant OTKA K 146380, 2023-2027; 4 years
- MTA-BME Lendület Quantum Information Theory Research Group; 2018–2023; 5 years

https://math.bme.hu/~qi/index.html

- NKFIH grant OTKA KH 129601; 2018–2021; 3 years
- NKFIH grant OTKA K 124152; 2017–2022; 5 years

## Individual fellowships and grants

- Bolyai János Research Fellowship of the Hungarian Academy of Sciences; 2016–2018; 2 years.
- European Commission Marie Curie International Incoming Fellowship: "Quantum Information Theory and Statistics (QUANTSTAT)"; 2 years: 2011–2013
- Junior Research Fellowship of the Erwin Schrödinger Institute, Vienna; 3 months in 2009
- Postdoctoral Research Fellowship of the Japan Society for the Promotion of Science (JSPS) and Grant-in-Aid for JSPS Fellows 18.06916; 2 years: 2006–2008
- Junior Research Fellowship of the Erwin Schrödinger Institute, Vienna; 3 months in 2006
- Junior Research Fellowship of the Hungarian Academy of Sciences; 2006 (declined)
- State scholarship for PhD students, Hungary; 3 years: 2000–2003

## Participating researcher in grants

- Quantum Information National Laboratory, 2020-2024, group leader; https://qi.nemzetilabor.hu/
- Quantum Technology National Excellence Program (HunQTech) of the National Research, Development and Innovation Office of Hungary, Project No. 2017-1.2.1-NKP-2017-00001; 2018
- Hungarian National Research Grant OTKA-104206: "Applications of Matrix Analysis"; 2016–2017
- Generalitat de Catalunya CIRIT Project No. 2014 SGR 966; 2014–2016
- Spanish MINECO FIS2013-40627: "Resources and Restrictions in Quantum Information Processing (RaR-QIP)"; 2015–2017
- Joint project of the Hungarian Academy of Sciences and the Japan Society for the Promotion of Science: "New Developments in Quantum Information Theory and Quantum Probability Theory", 2008–2010
- Hungarian National Research Grant OTKA-68258: "Inequalities in Information Theory", 2007–2011
- Hungarian National Research Grant OTKA-49835: "Random Events in Space and Time", 2005–2008
- Hungarian National Research Grant OTKA-46599: "Linear Analysis and its Applications", 2004–2007
- Joint project of the Hungarian Academy of Sciences and the Japan Society for the Promotion of Science: "Free Probability Theory and Random Matrices – Towards New Information Mathematics", 2004–2006

Research field: Quantum information theory, quantum statistics, quantum statistical physics.

Publications: link to MTMT link to google scholar

## Invited conference talks

- International Workshop on Matrix Analysis and Quantum Information Theory (MAA&QIT2024), 3-6 June 2024, University of Sciences, Hue University, Hue City, Vietnam (upcoming).
- Towards Infinite Dimension and Beyond in Quantum Information, 5-10 May 2024, Banff International Research Station, Granada (upcoming)
- Quantum TUT workshop 2024, 22 February 2024, Toyohashi University of Technology
- Analytical and Combinatorial Methods in Quantum Information Theory II, 24 28 July 2023, ICMS, Bayes Centre, Edinburgh
- Operator Algebras and Quantum Information, 4-6 May 2023, University of Delaware (canceled due to contracting covid)
- Quantum Information Theory 2023, 20-24 March 2023, Instituto de Ciencias Matemáticas, Madrid
- Mathematics of Quantum Information and Many-body Systems, 21-22 October 2022, University of Cambridge
- International Workshop on Operator Theory and its Applications (IWOTA) 2021, 16-20 August 2021, Lancester University (online)
- Interactions between Non-commutative Analysis and Quantum Information Theory, May 31- June 5, 2019, Harbin Institute of Technology
- Mathematical Aspects in Current Quantum Information Theory (MAQIT 2019), May 20-24, 2019, Seoul National University
- Workshop II of the Thematic Research Program: Operator Algebras, Groups and Applications to Quantum Information, May 13–17, 2019, ICMAT Madrid
- Beyond I.I.D. in Information Theory, 2018, Cambridge, UK
- Conference on Channels, Statistics, Information, Secrecy, Zero-error, And Randomness (CSISZÁR), June 4-5, 2018, Budapest
- Beyond I.I.D. in Information Theory, 2015, Banff, Canada
- High-Dimensional Problems and Quantum Physics, 2015, Paris
- Beyond I.I.D. in Information Theory, 2014, Singapore
- Beyond I.I.D. in Information Theory, 2013, Cambridge, UK
- Third COQUIT Conference, Collective Quantum Operations: Mean field, Control, Estimation, 2012, Turin
- International Symposium on Quantum Information and Quantum Logic, 2012, Hangzhou, China
- Nagoya Winter Workshop, 2011, Nagoya, Japan
- Mathematical Physics Days, 2010, Leuven, Belgium
- Workshop on Operator Structures in Quantum Information, 2009, Fields Institute, Toronto

## Other conference presentations and invited seminar talks

- Beyond I.I.D. in Information Theory, 2022, (online); talk
- Foxconn Quantum Computing Center in Taipei, Taiwan (online); invited seminar talk
- Quantum Information and Computing Seminar, University of Delaware, 2021, Delaware, US (online); series of three invited seminar talks
- Beyond I.I.D. in Information Theory, 2021, Taeipei, Taiwan (online); lightning talk

- Beyond I.I.D. in Information Theory, 2019, Sydney; talk
- AQIS 2016, Taipei; talk
- AQIS 2015, Seoul; talk
- Leibniz University of Hanover, 2015; invited seminar talk
- AQIS 2014, Kyoto; talk
- TQC 2014, Singapore; talk
- QIP 2014, Barcelona; poster + coauthor of a contributed talk
- QIP 2013, Beijing; posters
- AQIS 2012, Suzhou, China, talk
- Seefeld Quantum Information Workshop, 2012, Seefeld, Austria; poster
- New Directions in Quantum Statistics, 2012, Nottingham; poster
- University of Nottingham, 2012; invited seminar talk
- University of Cambridge, 2012; invited seminar talk
- QIP 2011, Singapore; *poster*
- QIP 2010, Zürich; poster
- XVI International Congress on Mathematical Physics, 2009, Prague; talk
- Yamagata University, Japan, 2009; invited seminar talk
- Shinshu University, Nagano, Japan, 2009; invited seminar talk
- Mini-Workshop on Quantum Statistics, 2008, Budapest; talk
- Information and Communication, 2008, Rényi Institute, Budapest; talk
- GSIS & DEX-SMI Workshop on Quantum Statistical Inference and Entanglement, 2008, Sendai, Japan; talk
- GSIS Workshop on Quantum Information Theory, 2008, Sendai, Japan; talk
- AQIS 2007, Kyoto; poster
- The 6th Sendai Workshop on Infinite Dimensional Analysis and Quantum Probability, Tohoku University, Sendai, Japan, 2007; talk
- Operator Structures in Quantum Information Theory, Banff, 2007; talk
- National Institute of Informatics, Tokyo, 2007; *invited seminar talk*
- Kyushu University, Fukuoka, 2007; invited seminar talk
- Wroclaw University, 2006; invited seminar talk
- The 5th Sendai Workshop on Infinite Dimensional Analysis and Quantum Probability, Sendai, 2006; talk
- Von Nemann Workshop, Budapest, 2006; talk
- Mathematical Physics Days, 2004, Leuven; talk
- Von Neumann Centennial Conference, 2003, Budapest; poster

## Community service

## Editorial work

- IEEE Transacions on Information Theory, associate editor for Quantum Information Theory, October 2018 - September 2021
- Quantum, editor, October 2016 July 2021, then member of the Steering Board http://quantum-journal.org/about/people/
- Journal of Mathematical Physics, member of the Editorial Advisory Board, May 2016 -

#### **Referee work**

- For journals: Communications in Mathematical Physics; Reviews in Mathematical Physics; Letters in Mathematical physics; Journal of Mathematical Physics; IEEE Transactions on Information Theory; Journal of Physics A; Linear Algebra and its Applications; International Journal of Quantum Information Theory; Infinite Dimensional Analysis, Quantum Probability and Related Topics; Periodica Mathematica Hungarica
- Member of the board of referees for the Hungarian National Agency for Research, Development and Innovation (NKFIH), section of Mathematics, 2018–2021

#### Conference organizer

- Main organizer of the Quantum Information Theory and Mathematical Physics workshop, Budapest, 28-30 August, 2023. (https://math.bme.hu/~mosonyi/QIMP2023/)
- Rényi 100 conference, organizer of the invited session on Quantum Information Theory, 20-23 June 2022; (https://conferences.renyi.hu/renyi100)
- Main organizer of the Quantum Information Theory and Mathematical Physics workshop, Budapest, 14-17 June, 2022. (https://math.bme.hu/~mosonyi/QIMP2022/)
- Main organizer of the Quantum Information Theory and Mathematical Physics workshop, Budapest, 2-5 September, 2019. (http://math.bme.hu/~mosonyi/QIMP2019/)
- Main organizer of the Quantum Information Theory and Mathematical Physics workshop, Budapest, 20-23 September, 2018. (http://math.bme.hu/~mosonyi/QIMP2018/index.html)
- Main organizer of the Quantum Information Theory and Mathematical Physics workshop, Budapest, 30 August-2 September, 2017. (https://www.renyi.hu/conferences/quinfo17/)
- Main organizer of the Quantum Information Theory and Mathematical Physics workshop, Budapest, 16-19. September, 2016. (http://www.renyi.hu/conferences/qinfo2016/)

#### Conference programme committee member

- 24th Asian Quantum Information Science Conference (AQIS 2024), Sapporo, Japan, 26–30 August 2024
- 19th Asian Quantum Information Science Conference (AQIS 2019), Seoul, Korea, August 19-23, 2019; (http://aqis-conf.org/2019/)
- 11th Central European Quantum Information Processing Workshop, 2014 (http://ceqip.eu/2014/)

## **Doctoral training**

- Referee of the doctoral thesis of Oskari Kerppo, University of Turku, 2022.
- Referee of the doctoral thesis of Martin Plávala, Comenius University Bratislava, 2019.
- Referee of the doctoral thesis of Kun Fang, University of Technology, Sydney, 2018.
- Referee of the doctoral thesis of Tamás Kói (http://math.bme.hu/~koitomi/indexangol.html). Date of defense: 4 December 2017.
- Referee for the departmental defense of the doctoral thesis of Gábor Balló (http://www.doktori. hu/index.php?menuid=193&lang=HU&vid=13256). Date of defense: 4 December 2013.
- Examiner at the general doctoral exam of Fanni Sélley, BME, 16 October 2018.
- Examiner at the general doctoral exam of Mihály Csirik, ELTE, 5 April 2017.

## Student supervision

- PhD Gábor Maróti, Mathematics PhD, BME, expected graduation 2025 Gergely Bunth, Mathematics PhD, BME, expected graduation 2024
- MSc Zoltán Kolarovszki, Physics MSc, BME, graduation June 2019 Gergely Bunth, Physics MSc, BME, graduation July 2018 Tamás Borsos, Physics MSc, ELTE, graduation June 2018
- BSc Bendegúz Sulyok, Physics BSc, BME, graduation June 2018
   Richárd Simon, Mathematics BSc, ELTE, graduation June 2018
   Tamás Tossenberger, Mathematics BSc, ELTE, graduation June 2017

## Teaching activity

## Intensive graduate courses on Quantum Information Theory

- Invited tutorial on entropies, QIP 2019, Colorado, Boulder. (https://jila.colorado.edu/qip2019/ program.html)
- Invited lecturer at "Stochastic Methods in Quantum Mechanics", Summer School in Autrans July 11–22, 2016. Short course on quantum statistics.
- Tohoku University, Sendai, Japan, 2006 and 2009. Mini-courses on Quantum Information Theory.

## Regular university courses

BME: 2000-2024

- Lecture course on Quantum Information Theory (BSc, MSc, PhD, 2015–2023, autumn).
- Lecture course on Matrix Analysis (BSc, MSc, PhD, 2022, 2023 autumn)
- Lecture course on Advanced Quantum Information Theory (BSc, MSc, PhD, 2018, 2019, 2020, 2021 spring).
- Lecture course on Matrix Analysis and Quantum Information Theory (BSc, MSc, PhD, 2017 spring, 2021, autumn)
- Lecture course on Advanced Measure Theory (BSc, MSc, 2017, autumn)
- Lecture course on Measure Theory and Complex Functions (BSc, 2016, spring)
- Lecture course on Advanced Functional Analysis (MSc and PhD; twice between 2000 and 2006).
- Exercise classes in Analysis and Functional Analysis for Mathematics and Engineering students (BSc, several times between 2000 and 2006)

• Calculus and Linear Algebra lectures and exercise classes for foreign students in Engineering (BSc, several times between 2000 and 2006)

Technical University of Munich: 2015, one semester

• Exercise class in Functional Analysis for Mathematics students (BSc and MSc).

University of Bristol: 2011–2013, two semesters

- Lecture course on Information Theory for final-year Mathematics and Engineering undergraduates.
- Calculus tutorials for students in Mathematics (BSc, first and second semester course).

ELTE: 1998–2000, four semesters

- Exercise classes in Analysis for teacher training students in Mathematics (BSc, four semesters course; once).
- Exercise class in Complex Function Theory for Physics students (BSc, 2000).

#### Other

Catholic University of Leuven: 2004–2005, two semesters

• Supervising independent research projects in Theoretical Physics for third-year Physics students (two projects).

#### Language skills

Hungarian (native), English (fluent), Japanese (intermediate, speaking)