

# Curriculum Vitae

## Personal information

Name: Jan Maas  
Date and place of birth: April 6, 1982, Leidschendam, The Netherlands  
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## Education

2005 – 2009 PhD in Applied Mathematics, TU Delft, The Netherlands  
PhD-thesis: *Analysis of Infinite Dimensional Diffusions*,  
defended on 21 April 2009 (with honours)  
2000 – 2005 Study of Applied Mathematics, TU Delft, The Netherlands  
Master 2005 (with honours),  
MSc-thesis *The domain of symmetric Ornstein-Uhlenbeck operators in infinite dimensions*,  
defended on 31 August 2005  
Bachelor 2003 (with honours), Propaedeutic Exam 2001 (with honours)  
1994 – 2000 VWO (Dutch secondary education), Aloysius College, The Hague (diploma 2000)

## Current position

Since 2020 Professor, Institute of Science and Technology Austria (IST Austria),  
Klosterneuburg, Austria

## Previous positions

2014 – 2020 Assistant Professor, Institute of Science and Technology Austria (IST Austria),  
Klosterneuburg, Austria  
2009 – 2014 Postdoc, University of Bonn, Germany  
– supported by an NWO Rubicon Fellowship (12/'09 – 03/'11 & 10/'11 – 05/'12)  
– PI in Collaborative Research Centre SFB1060 (01/'13 – 09/'14)  
2009 Postdoc, University of Warwick, UK  
2005 – 2009 PhD-student, TU Delft, The Netherlands

## Grants and distinctions

2017 – 2021 PI in Doctoral Program *Dissipation and dispersion in nonlinear partial differential equations*  
2017 – 2021 PI in Special Research Programme *Taming Complexity in Partial Differential Systems*  
2017 – 2022 ERC Starting Grant *Optimal Transport and Stochastic Dynamics*

2013 – 2014	PI in Collaborative Research Centre SFB1060 <i>The Mathematics of Emergent Effects</i> at the University of Bonn, German Science Foundation
2009	NWO Rubicon Fellowship (2-year grant for postdoctoral research abroad)
2001	CIVI Propedeuseprijs Wiskunde for best first year in mathematics at TU Delft
2000	TU Delft Sterbeurs for outstanding high school students

### Long research visits

2013	MSRI, Berkeley (2,5 months)
2013	Australian National University, Canberra (1 month)
2009	Courant Institute, New York University (2 months)
2007	University of New South Wales, Sydney (7 months)

### Supervision of postdocs

Since 2020	Lorenzo Dello Schiavo
Since 2020	Melchior Wirth
Since 2019	Haonan Zhang
Since 2019	Federico Sau
2017	Arseniy Akopyan
2016 – 2020	Máté Gerencsér
2016 – 2019	Peter Nejjar (with Laszlo Erdős)
2015 – 2018	Giovanni Zanco

### Supervision of PhD students

Since 2020	Ksenia Khudiakova
Since 2018	Lorenzo Portinale
Since 2018	Dario Feliciangeli (with Robert Seiringer)
2016 – 2000	Dominik Forkert

### Teaching

Fall '20	Optimal transport (graduate course)
Fall '18	Large deviations (graduate course)
Fall '17	Probability and statistical inference (graduate course)
2016 – 2019	Mathematics core course (graduate course)
Fall '15	Selected topics in partial differential equations (graduate course)
Spring '15	Optimal transportation (graduate course)
Winter '13	Stochastic partial differential equations (master course for mathematics students)

- Summer '12    Angewandte Stochastik (bachelor course for mathematics students)
- Summer '11    Markov processes (master course for mathematics students)
- 2006 – 2009    Several calculus & linear algebra lecture courses for engineering students

Supervision of MSc/BSc students:

- 2015            Dominik Forkert (MSc, TU Vienna; complete PhD at IST Austria)  
*On convergence of gradient flow structures for discrete porous medium and Fokker-Plank equations*
- 2014            Jörg Martin (MSc, U Bonn; completed PhD at HU Berlin)  
*Approximating stochastic PDEs using paradiifferential calculus*
- 2013            Anna Kraut (BSc, U Bonn; currently postdoc at U Bonn)  
*Gradient structures for chemical reaction equations*
- 2013            Florian Wechsung (BSc, U Bonn; currently postdoc at NYU)  
*Optimal transport and robust hedging*
- 2013            Sergiy Bogdanov (BSc, U Bonn)  
*Random matrices and quantum entropy*
- 2012            Eva Kopfer (MSc, U Bonn; currently postdoc at U Bonn)  
*Optimal transport and large deviations*

### Organisational activities

- 04–06/2019    Co-organisator of Thematic Programme on *Optimal Transport*, ESI Vienna
- 06/2018        Co-organisator of the summer school on *Probability and Mathematical Physics*, IST Austria
- 03/2015        Co-organisator of the conference *New trends in optimal transport*, HCM Bonn
- Since 2014    Co-organisator of the Analysis & Mathematical Physics Seminar, IST Austria
- 2012–2014    Co-organisator of the Probability Seminar, University of Bonn
- 2007–2008    Co-organisator of the 11th Internet Seminar *Stochastic Evolution Equations*

### Reviewing activities

Referee for various journals, including *Annales de l'Institut Henri Poincaré*, *Annali SNS Pisa*, *Annals of Probability*, *Bernoulli*, *Calculus of Variations and Partial Differential Equations*, *Electronic Communications in Probability*, *Electronic Journal of Probability*, *ESAIM Control, Optimisation and Calculus of Variations*, *Geometric and Functional Analysis*, *Inventiones mathematicae*, *Journal für die Reine und Angewandte Mathematik*, *Journal of Evolution Equations*, *Journal of Functional Analysis*, *Journal of Mathematical Physics*, *Potential Analysis*, *Probability Theory and Related Fields*, etc.

Referee for various national funding agencies.

## Selected recent collaborations

Eric Carlen (Rutgers U), Philippe Clément (TU Delft), Matthias Erbar (U Bielefeld), Max Fathi (Toulouse U), Peter Gladbach (U Bonn), Martin Hairer (Imperial College), Daniel Matthes (TU Munich), Ioannis Karatzas (Columbia U), Eva Kopfer (U Bonn), Alexander Mielke (WIAS & HU Berlin), Jan van Neerven (TU Delft), Pierre Portal (ANU Canberra), Martin Rumpf (U Bonn), Walter Schachermayer (U Vienna) Prasad Tetali (Georgia Tech), Hendrik Weber (U Bath).

## 10 representative publications

1. A. MIELKE AND J. MAAS, *Modeling of chemical reaction systems with detailed balance using gradient structures*  
J. Statist. Phys. **181** (2020), 2257–2303
2. P. GLADBACH, E. KOPFER, J. MAAS, AND L. PORTINALE, *Homogenisation of one-dimensional discrete optimal transport*  
J. Math. Pures Appl. **139** (2020), 204–234
3. E. CARLEN AND J. MAAS *Non-commutative calculus, optimal transport and functional inequalities in dissipative quantum systems*  
J. Statist. Phys. **178** (2020), 319–378.
4. P. GLADBACH, E. KOPFER, AND J. MAAS, *Scaling limits of discrete optimal transport*  
SIAM J. Math. Anal. **52** (2020), 2759–2802
5. E. CARLEN AND J. MAAS *Gradient flow and entropy inequalities for quantum Markov semi-groups with detailed balance*  
J. Funct. Anal. **273** (5) (2017), 1810–1869.
6. M. FATHI AND J. MAAS, *Entropic Ricci curvature bounds for discrete interacting systems*  
Ann. Appl. Probab. **26** (3) (2016), 1774–1806.
7. M. HAIRER, J. MAAS, AND H. WEBER, *Approximating rough stochastic PDEs*  
Comm. Pure Appl. Math. **67** (5) (2014), 776–870.
8. M. ERBAR AND J. MAAS, *Ricci curvature of finite Markov chains via convexity of the entropy*  
Arch. Ration. Mech. Anal. **206** (3) (2012), 997–1038.
9. M. HAIRER AND J. MAAS, *A spatial version of the Itô-Stratonovich correction*  
Ann. Probab. **40** (4) (2012), 1675–1714.
10. J. MAAS, *Gradient flows of the entropy for finite Markov chains*  
J. Funct. Anal. **261** (8) (2011), 2250–2292.

## Selected invited lecture series at advanced schools

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|---------|--|
| 02/2019 | Mini-course at Winterschool on Calculus of Variations and Probability, Toulouse  |
| 09/2016 | Mini-course at DK Summer school on Nonlinear PDE, Weissensee   |
| 03/2016 | Mini-course at Workshop on Large Deviations for Interacting Particle Systems and Partial Differential Equations, EURANDOM, Eindhoven |
| 01/2015 | Mini-course at winter school on Optimal transportation, Hausdorff Institute for Mathematics, Bonn                                    |

- 03/2014 Mini-course at workshop on Mass transport in analysis and probability, EURANDOM, Eindhoven
- 05/2012 Mini-course at summer school on Analysis and Geometry in Metric Measure Spaces, Scuola Normale Superiore, Pisa

**Selected invited lectures at conferences**

- 09/2020 MF Oberwolfach: Workshop on Variational Methods for Evolution (online)
- 12/2019 Palm Springs: SIAM Conference on Analysis of Partial Differential Equations
- 11/2019 Oberwolfach: Workshop on Heat Kernels, Stochastic Processes and Functional Inequalities
- 09/2019 Fukuoka: Conference on Stochastic Analysis
- 05/2019 ICMAT Madrid: BYMAT Conference
- 11/2018 SNS Pisa: Workshop on Optimal Transportation and Applications
- 09/2018 WIAS Berlin: Analysis of Evolutionary and Complex Systems
- 09/2018 ICMS Edinburgh: Workshop on Gradient flows: challenges and new directions
- 09/2018 Bielefeld: 9th International Conference on Stochastic Analysis and its Applications
- 04/2018 BIRS Banff: Workshop on Entropies, the Geometry of Nonlinear Flows, and their Applications
- 09/2017 MPI Bonn: Conference on Metric Measure Spaces and Ricci Curvature
- 09/2017 Salzburg: ÖMG-DMV Congress
- 08/2017 CIRM Luminy: Conference on Topological and Geometrical Structure of Information
- 07/2017 U Potsdam: Conference on Analysis and Geometry on Graphs and Manifolds
- 07/2017 Moscow: Conference on Stochastic Processes and their Applications
- 06/2017 SISSA Trieste: Conference on Geometric Analysis on smooth and non-smooth spaces
- 05/2017 ICTP Trieste: Advanced School & Workshop on Nonlocal Partial Differential Equations and Applications to Geometry, Physics and Probability
- 03/2017 U Lyon: Workshop on Curvature-Dimension
- 11/2016 SNS Pisa: Workshop on Optimal Transportation and Applications
- 11/2016 TU Vienna: Workshop on Nonlinear PDEs & Gradient Flows
- 08/2016 Hausdorff Institute, Bonn: Workshop on Optimal Transport
- 07/2016 Schrödinger Institute Vienna: Workshop on Variational and Hamiltonian Structures
- 06/2016 KIAS Seoul: CMC conference on Analysis, Geometry, and Optimal Transport
- 06/2015 UPMC Paris 6: Workshop on Gradient flows in Paris
- 12/2014 MF Oberwolfach: Workshop on Variational Methods for Evolution
- 10/2014 Centro de Giorgi, Pisa: Conference on Optimal Transportation and Applications
- 07/2014 Banff: Workshop on Entropy Methods, PDEs, Functional Inequalities, and Applications
- 06/2014 St. Petersburg: Workshop on Stochastic processes and high dimensional probability distributions

01/2014	IPAM UCLA: Workshop on Rough Paths, Theory and Applications
11/2013	CIRM Luminy: Workshop on Discrete Curvature, Theory and Applications
09/2013	Simons Institute Berkeley (USA): Workshop on Functional Inequalities in Discrete Spaces with Applications
08/2013	MSRI Berkeley: Introductory Workshop on Optimal Transport: Geometry and Dynamics
05/2013	MF Oberwolfach: Workshop on Heat Kernels, Stochastic Processes and Functional Inequalities
04/2013	Nantes: Workshop on Randomness and Partial Differential Equations
11/2012	Pisa: Conference on Optimal Transportation and Applications
10/2012	Nagoya: Workshop on Wasserstein Geometry and Information Geometry ( <i>2 lectures</i> )
10/2012	Nagoya: Workshop on Stochastic Analysis
10/2012	Yamagata: Workshop on Geometry and Probability
09/2012	Bedlewo: 6th International Conference on Stochastic Analysis and its Applications
09/2012	Warwick: Workshop At the Frontier of Analysis and Probability
08/2012	MF Oberwolfach: Workshop on Rough Paths and PDEs
11/2011	Munich: Conference on Perspectives in Optimal Transportation
10/2011	Bad Herrenalb: Conference on Evolution equations: randomness and asymptotics
9/2011	Paris: Conference on Metastability and Stochastic Processes
9/2011	Bonn: 5th International Conference on Stochastic Analysis and its Applications
6/2011	Cambridge: Special Semester on Discrete Analysis
8/2010	Bangalore: ICM Satellite Conference on Probability and Stochastic Processes
5/2010	York: Conference on Stochastic Partial Differential Equations
1/2010	Levico Terme: Conference on Stochastic Analysis, SPDE's, Particle Systems, Optimal Transport

### Selected seminar talks

2020	TU Munich
2019	Stanford U, UC Berkeley, U Bern
2018	Utrecht (Mark Kac Seminar), U Fribourg, U Warwick
2017	TU Graz, RU Nijmegen
2016	U Jyväskylä, U Potsdam
2015	TU Vienna, U Zurich, U Vienna
2014	U Jena, U Vienna,
2013	ANU Canberra (3x), U Brussels, TU Eindhoven, WIAS Berlin
2012	SNS Pisa, U Pisa, IHP Paris, TU Eindhoven, U Toulouse (2x), WIAS Berlin, Bielefeld U, Tohoku U, TU Munich
2011	U Warwick, U Pavia, U Strasbourg, U Bielefeld

# List of publications

## Preprints

- [1] I. Karatzas, J. Maas, and W. Schachermayer. *Trajectorial dissipation and gradient flow for the relative entropy in Markov chains*. 2020. eprint: [arXiv:2005.14177](https://arxiv.org/abs/2005.14177).

## Published and accepted articles

- [2] J. Maas and A. Mielke. “Modeling of Chemical Reaction Systems with Detailed Balance Using Gradient Structures”. *J. Stat. Phys.* 181.6 (2020), pp. 2257–2303. DOI: [10.1007/s10955-020-02663-4](https://doi.org/10.1007/s10955-020-02663-4).
- [3] P. Gladbach, E. Kopfer, and J. Maas. “Scaling limits of discrete optimal transport”. *SIAM J. Math. Anal.* 52.3 (2020), pp. 2759–2802. DOI: [10.1137/19M1243440](https://doi.org/10.1137/19M1243440).
- [4] P. Gladbach, E. Kopfer, J. Maas, and L. Portinale. “Homogenisation of one-dimensional discrete optimal transport”. *Journal de Mathématiques Pures et Appliquées* 139 (2020), pp. 204–234. DOI: <https://doi.org/10.1016/j.matpur.2020.02.008>.
- [5] E. A. Carlen and J. Maas. “Non-commutative Calculus, Optimal Transport and Functional Inequalities in Dissipative Quantum Systems”. *J. Stat. Phys.* 178.2 (2020), pp. 319–378. DOI: [10.1007/s10955-019-02434-w](https://doi.org/10.1007/s10955-019-02434-w).
- [6] M. Erbar, J. Maas, and M. Wirth. “On the geometry of geodesics in discrete optimal transport”. *Calc. Var. Partial Differential Equations* 58.1 (2019), pp. 1–19. DOI: [10.1007/s00526-018-1456-1](https://doi.org/10.1007/s00526-018-1456-1).
- [7] J. Maas. “Entropic Ricci curvature for discrete spaces”. *Modern approaches to discrete curvature*. Vol. 2184. Lecture Notes in Math. Springer, Cham, 2017, pp. 159–174. DOI: [10.1007/978-3-319-58002-9\\_5](https://doi.org/10.1007/978-3-319-58002-9_5).
- [8] E. A. Carlen and J. Maas. “Gradient flow and entropy inequalities for quantum Markov semi-groups with detailed balance”. *J. Funct. Anal.* 273.5 (2017), pp. 1810–1869. DOI: [10.1016/j.jfa.2017.05.003](https://doi.org/10.1016/j.jfa.2017.05.003).
- [9] J. Maas, M. Rumpf, and S. Simon. “Transport Based Image Morphing with Intensity Modulation”. *Scale Space and Variational Methods in Computer Vision: 6th International Conference, SSVM 2017, Kolding, Denmark, June 4-8, 2017, Proceedings*. Springer, 2017, pp. 563–577. DOI: [10.1007/978-3-319-58771-4\\_45](https://doi.org/10.1007/978-3-319-58771-4_45).
- [10] J. Maas and D. Matthes. “Long-time behavior of a finite volume discretization for a fourth order diffusion equation”. *Nonlinearity* 29.7 (2016), pp. 1992–2023. DOI: [10.1088/0951-7715/29/7/1992](https://doi.org/10.1088/0951-7715/29/7/1992).
- [11] M. Fathi and J. Maas. “Entropic Ricci curvature bounds for discrete interacting systems”. *Ann. Appl. Probab.* 26.3 (2016), pp. 1774–1806. DOI: [10.1214/15-AAP1133](https://doi.org/10.1214/15-AAP1133).
- [12] M. Erbar, J. Maas, and P. Tetali. “Discrete Ricci curvature bounds for Bernoulli-Laplace and random transposition models”. *Ann. Fac. Sci. Toulouse Math. (6)* 24.4 (2015), pp. 781–800. DOI: [10.5802/afst.1464](https://doi.org/10.5802/afst.1464).
- [13] M. Erbar, J. Maas, and D. R. M. Renger. “From large deviations to Wasserstein gradient flows in multiple dimensions”. *Electron. Commun. Probab.* 20 (2015), no. 89, 12. DOI: [10.1214/ECP.v20-4315](https://doi.org/10.1214/ECP.v20-4315).
- [14] J. Maas, M. Rumpf, C. Schönlieb, and S. Simon. “A generalized model for optimal transport of images including dissipation and density modulation”. *ESAIM Math. Model. Numer. Anal.* 49.6 (2015), pp. 1745–1769. DOI: [10.1051/m2an/2015043](https://doi.org/10.1051/m2an/2015043).

- [15] E. A. Carlen and J. Maas. “An analog of the 2-Wasserstein metric in non-commutative probability under which the fermionic Fokker-Planck equation is gradient flow for the entropy”. *Comm. Math. Phys.* 331.3 (2014), pp. 887–926. DOI: 10.1007/s00220-014-2124-8.
- [16] M. Hairer, J. Maas, and H. Weber. “Approximating rough stochastic PDEs”. *Comm. Pure Appl. Math.* 67.5 (2014), pp. 776–870. DOI: 10.1002/cpa.21495.
- [17] M. Erbar and J. Maas. “Gradient flow structures for discrete porous medium equations”. *Discrete Contin. Dyn. Syst.* 34.4 (2014), pp. 1355–1374.
- [18] S. Dirksen, J. Maas, and J. van Neerven. “Poisson stochastic integration in Banach spaces”. *Electron. J. Probab.* 18 (2013), No. 100, 28. DOI: 10.1214/EJP.v18-2945.
- [19] N. Gigli and J. Maas. “Gromov-Hausdorff convergence of discrete transportation metrics”. *SIAM J. Math. Anal.* 45.2 (2013), pp. 879–899. DOI: 10.1137/120886315.
- [20] M. Erbar and J. Maas. “Ricci curvature of finite Markov chains via convexity of the entropy”. *Arch. Ration. Mech. Anal.* 206.3 (2012), pp. 997–1038. DOI: 10.1007/s00205-012-0554-z.
- [21] M. Hairer and J. Maas. “A spatial version of the Itô-Stratonovich correction”. *Ann. Probab.* 40.4 (2012), pp. 1675–1714. DOI: 10.1214/11-AOP662.
- [22] J. Maas, J. van Neerven, and P. Portal. “Whitney coverings and the tent spaces  $T^{1,q}(\gamma)$  for the Gaussian measure”. *Ark. Mat.* 50.2 (2012), pp. 379–395. DOI: 10.1007/s11512-010-0143-z.
- [23] J. Maas and J. van Neerven. “Gradient estimates and domain identification for analytic Ornstein-Uhlenbeck operators”. *Parabolic problems*. Vol. 80. Progr. Nonlinear Differential Equations Appl. Birkhäuser/Springer Basel AG, Basel, 2011, pp. 463–477. DOI: 10.1007/978-3-0348-0075-4\_24.
- [24] J. Maas, J. van Neerven, and P. Portal. “Conical square functions and non-tangential maximal functions with respect to the Gaussian measure”. *Publ. Mat.* 55.2 (2011), pp. 313–341. DOI: 10.5565/PUBLMAT\_55211\_03.
- [25] J. Maas. “Gradient flows of the entropy for finite Markov chains”. *J. Funct. Anal.* 261.8 (2011), pp. 2250–2292. DOI: 10.1016/j.jfa.2011.06.009.
- [26] P. Clément and J. Maas. “A Trotter product formula for gradient flows in metric spaces”. *J. Evol. Equ.* 11.2 (2011), pp. 405–427. DOI: 10.1007/s00028-010-0096-5.
- [27] J. Maas. “Malliavin calculus and decoupling inequalities in Banach spaces”. *J. Math. Anal. Appl.* 363.2 (2010), pp. 383–398. DOI: 10.1016/j.jmaa.2009.08.041.
- [28] J. Maas and J. van Neerven. “Boundedness of Riesz transforms for elliptic operators on abstract Wiener spaces”. *J. Funct. Anal.* 257.8 (2009), pp. 2410–2475. DOI: 10.1016/j.jfa.2009.07.001.
- [29] J. Maas and J. van Neerven. “On the domain of nonsymmetric Ornstein-Uhlenbeck operators in Banach spaces”. *Infin. Dimens. Anal. Quantum Probab. Relat. Top.* 11.4 (2008), pp. 603–626. DOI: 10.1142/S0219025708003245.
- [30] J. Maas and J. van Neerven. “A Clark-Ocone formula in UMD Banach spaces”. *Electron. Commun. Probab.* 13 (2008), pp. 151–164. DOI: 10.1214/ECP.v13-1361.
- [31] J. Maas and J. van Neerven. “On analytic Ornstein-Uhlenbeck semigroups in infinite dimensions”. *Arch. Math. (Basel)* 89.3 (2007), pp. 226–236. DOI: 10.1007/s00013-007-2082-x.