Sarah-Tanja Hess

Curriculum Vitæ

University of Konstanz
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Personal Information

Date of Birth	15/03/1996
Nationality	German

Education

Since 10/2020	**Doctoral Studies in Mathematics**, *University of Konstanz*.
	Project Title: Intermediate Cones between the SOS and PSD Cones
	Expected Date of Award: 09/2024
	Supervisor: Prof. Dr. S. Kuhlmann
	Co-Supervisor: Asst. Prof. Dr. C. Goel
10/2018 – 09/2020	**Master of Science (Mathematics)**, *University of Konstanz*.
	Research Group: Real Algebraic Geometry
	Supervisors: Prof. Dr. Salma Kuhlmann, Dr. habil. Maria Infusino
	Grade: Very Good with Distinction
10/2015 – 10/2018	**Bachelor of Science (Mathematics)**, *University of Konstanz*.
	Research Group: Real Algebraic Geometry
	Supervisor: Prof. Dr. Salma Kuhlmann
	Grade: Excellent
10/2014 – 10/2015	**Bachelor Programme in Psychology**, *University of Konstanz*.
06/2014	**Abitur**, *Friedrich-Wöhler-Gymnasium*.
	Grade: Very Good
09/2012 – 06/2014	**Senior Classes**, *Friedrich-Wöhler-Gymnasium*.
09/2006 – 06/2012	**Secondary School**, *Deutsche Schule Shanghai*.

Publications and Preprints

Preprints	**A Refinement of Hilbert's 1888 Theorem: Separating Cones along the Veronese Variety**, *ArXiv 2401.03813*.
	Intermediate Cones between the Cones of Positive Semidefinite Forms and Sums of Squares, *ArXiv 2303.13178*.
Extended Abstracts	**Intermediate Cones between the SOS and PSD Cones: Quartics and Sextics**, `https://publications.mfo.de/handle/mfo/4030`.
	Positive Semidefinite Quadratic Forms on Varieties Defined by Quadratic Forms, `https://doi.org/10.15495/EPub_UBT_00006809`.
Master's Thesis	**Examination of the Connection between Horn's Problem and the Lax Conjecture**, `http://nbn-resolving.de/urn:nbn:de:bsz:352-2-160cfrqubrq6n2`.
Bachelor's Thesis	**Elliptic Curves and their Application in Key-Exchange Cryptography**, `http://nbn-resolving.de/urn:nbn:de:bsz:352-2-gulfjde9kdan6`.

Teaching Activities

Since 10/2023	**University of Konstanz**. Assistent Lecturer for the Course *Linear Algebra I*
09/2021 – 02/2023	**University of Applied Sciences Konstanz**. Lecturer for the Course *Consolidation of Fundamental Mathematics* and the *Pre-Course in Mathematics*
10/2020 – 03/2022	**University of Konstanz**. Assistent Lecturer for the Courses *Positive Polynomials and Moment Problems*, *Algorithmic Algebraic Geometry*, *Algebraic Number Theory*, *Algebra II*, *Algebra I* and the *Support Course in Mathematics*
10/2019 – 03/2020	**University of Konstanz**. Personal Coach for a Pupil Student in Mathematics
10/2016 – 03/2020	**University of Konstanz**. Class Tutor for the Courses *Stochastic Processes I*, *Probability Theory*, *Algebra I*, *Linear Algebra II*, *Linear Algebra I*, *Support Course in Mathematics* and the *Pre-Course in Mathematics*

Scholarships and Awards

07/2023	*SIAM Student Travel Award* from the *Society for Industrial and Applied Mathematics* (SIAM); 300€ and accommodation
06/2023	Travel Grant financed by the *Doctoral Fund of the University of Konstanz*; 866€
03/2023	*Oberwolfach Leibniz Graduate Student* Award; 200€
09/2022	Travel Grant financed by the *Doctoral Fund of the University of Konstanz*; 835€
08/2022	Travel Grant from the *European Women in Mathematics* (EWM); 400€
03/2022 – 03/2024	Doctoral Scholarship of the *German Academic Scholarship Foundation* offering financing (since 09/2023) and mentorship
09/2021 – 08/2023	Doctoral Scholarship following the *Landesgraduiertenförderungsgesetz* provided by the University of Konstanz and the Federal State Baden-Württemberg
01/2020	*Award for Academic Excellence* attributed by the University of Konstanz Alumni Association; 200€
03/2019 – 02/2020	Scholarship for Students provided by the *German Academic Scholarship Foundation* including financing and mentorship (both accepted)
09/2018	Travel Grant from the *Konstanz Women in Mathematics* (KWIM); 500€
06/2014	Abitur Prize from the *German Mathematical Society* and the *German Physical Society*

Research Stays and Talks

25/01/2024	**University of Konstanz**, Konstanz. Lecture on the main results of the dissertation: *Intermediate Cones for the SOS and PSD Cones*

15/12/2023	**University of Konstanz**, Konstanz. Seminar: Real Algebraic Geometry Talk: *Separating Cones for the SOS and PSD Cones that Fail to be Spectrahedral Shadows*
09/10 – 11/10/2023	**Universités Paris VI et VII**, Paris. Seminar: Structures Algébriques Ordonnées Talk: *A Refinement of Hilbert's 1888 Theorem*
04/10 – 06/10/2023	**Women in Automorphic Forms 2023**, Konstanz. Talk: *A Refinement of Hilbert's 1888 Theorem: Survey Talk*
31/07 – 04/08/2023	**International Workshop on Operator Theory and its Applications 2023**, Helsinki. Special Session: Moment Problems and Applications Talk: *A Cone Filtration in the Dual Setting to the Moment Problem*
10 – 14/07/2023	**SIAM Conference on Applied Algebraic Geometry**, Eindhoven. Invited Session: Moment Problems, Convex Algebraic Geometry, and Semidefinite Relaxations Talk: *Separating Cones for the SOS and PSD Cones*
25 – 28/06/2023	**Max Planck Institute for Mathematics in the Sciences**, Leipzig.
29/05 – 02/06/2023	**Mathematisches Forschungsinstitut Oberwolfach**, Oberwolfach. Seminar: Metric Algebraic Geometry
17 – 24/03/2023	**Mathematisches Forschungsinstitut Oberwolfach**, Oberwolfach. Co-Worker in the Oberwolfach Leibniz Fellowship Program *Nonnegative polynomials vs Sums of squares* organized by Asst. Prof. Dr. C. Goel
12 – 17/03/2023	**Mathematisches Forschungsinstitut Oberwolfach**, Oberwolfach. Oberwolfach Leibniz Graduate Student Workshop: Real Algebraic Geometry with a View toward Koopman Operator Methods Talk: *Intermediate Cones between the SOS and PSD Cones: Quartics and Sextics*
14 – 15/02/2023	**6$^{\text{th}}$ Meeting of the *Danube-Rhine Model Theory and Applications* Network**, Passau.
25 – 28/09/2022	**Colloquium Logicum 2022**, Konstanz.
21 – 23/09/2022	**Geometry in Complexity and Computations**, Konstanz.
12 – 16/09/2022	**25th International Symposium on Mathematical Theory of Networks and Systems**, Bayreuth. Invited Session: Moment Problems, Convex Algebraic Geometry, and Semidefinite Relaxations Talk: *Positive Semidefinite Quadratic Forms on Varieties Defined by Quadratic Forms*
05 – 09/09/2022	**Final Workshop of the *Polynomial Optimization, Efficiency through Moments and Algebra* Network**, Paris.
22 – 26/08/2022	**EWM General Meeting**, Helsinki. Session: Real Algebraic Geometry in Action with a View Toward Optimization Talk: *Intermediate Cones between the SOS and PSD Cones*
01 – 07/03/2020	**Mathematisches Forschungsinstitut Oberwolfach**, Oberwolfach. Workshop: Real Algebraic Geometry with a View Toward Hyperbolic Programming and Free Probability
24/01/2020	**5$^{\text{th}}$ Meeting of the *Danube-Rhine Model Theory and Applications* Network**, Konstanz.

22 – 26/06/2019	**International Workshop on Operator Theory and its Applications 2019**, Lisbon. Special Session: The Truncated Moment Problem
06 – 07/12/2018	**KWIM Festtage**, Konstanz.
03 – 07/09/2018	**EWM General Meeting**, Graz.

Academic Research Activities

02 – 08/2019	**Academic Research Associate**, *University of Konstanz.* Research Group: Numerics by Prof. Dr. Stefan Volkwein in cooperation with the Renal Research Institute (New York) Project: *Mathematical Modelling of the Dialysis of Urea Using Hyperbolic PDEs*
10/2018 – 02/2019	**Academic Research Associate**, *University of Konstanz.* Research Group: Numerics by Prof. Dr. Stefan Volkwein Project: *Optimal Stationary Heat Source*

Voluntary Work

24 – 26/11/2023	Commissioner in the selection seminar of the German Academic Scholarship Foundation
Since 07/2023	Member of the *Mathe Initiative Bodensee*
13/07/2022	Ambassador for Women in Mathematics on behalf of KWIM at the event *Wege in die Promotion*
Since 2022	Volunteer at the yearly *Tag der Mathematik* at the University of Konstanz
Since 2019	Tutoring of University Students
04/2019 – 09/2020	Ambassador of the German Academic Scholarship Foundation
Since 2018	Active Member of KWIM
2018 – 2019	Yearly Election Worker for the University of Konstanz
Since 2008	Tutoring of High School Students
2007 – 2012	Certified Conflict Mediator at the German School Shanghai

Languages

German	Mother Tongue
English	C2
French	B2
Chinese	A1
Sign Language	German, Intermediate Level, DGS II