

CURRICULUM VITAE

JAN DE BEULE

Personal Information

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Education

- 2000 - 2004 **PhD in mathematics** (thesis: *Blocking sets and partial spreads in finite polar spaces*)
Ghent University, Faculty of Sciences.
Supervisor: prof. dr. Leo Storme
- 1998 - 2001 **Qualified Teacher's Degree for Secondary Education – Section 2, in Mathematics**, (with Distinction), Ghent University.
- 1996 - 2000 **Diploma of the Second Cycle (Licentiaat) in Mathematics**
(with Great Distinction), Ghent University.

Work experience and positions held

- since 25/10/2015: Postdoctoraal Researcher/Lecturer (90 %/10 %), Vrije Universiteit Brussel
- 1/10/2012 – 30/09/2014: Lecturer (part-time, 10 %), Vrije Universiteit Brussel.
- 1/10/2009 – 24/10/2015: Postdoctoral Research Fellow of the National Research Foundation (FWO, www.fwo.be/en) (full time, 90 % in 2012–2014), located at Ghent University.
- 1/05/2008 – 30/09/2009: Postdoctoral Researcher at Ghent University (full time). Position funded by a contract on a project of the Research Council of Ghent University.
- 1/4/2007 – 30/04/2008: Postdoctoral Researcher at Ghent University (part time, 10 %).
- 1/4/2007 – 30/04/2008: Policy Adviser of the National Research Foundation (full time). In this position I was responsible for following up and studying research policy of the Flemish Government, and formulating advice to the Research Foundation.
- 1/10/2004 – 31/03/2007: Postdoctoral Research Fellow of Ghent University (full time). Fellowship funded by the Research Council of Ghent University.
- 1/10/2000 – 30/09/2004: PhD student, funded on a project of the Research Council of Ghent University.

Research

- Research in discrete mathematics, with emphasis on finite geometry, (applications in) coding theory and cryptography.

- Research interest in computer algebra and computational mathematics, development of algorithms to investigate particular geometric structures. This resulted so far in the GAP-packages **forms** (which implements sesquilinear and quadratic forms on vector spaces over finite fields) and **fining** (which implements finite incidence structures and actions of their symmetry groups).
- Research interest in didactics of mathematics and its relation with discrete mathematics.
- Experience in supervising PhD students.
- Several short and long research stays, including stays in Gießen (Germany): 8 months, Budapest (Hungary): 7 months, Barcelona (Spain): 3 months, Vicenza (Italy): 5 weeks and Perth (Australia): 6 weeks.
- Several talks at international conferences and colloquia, of which 5 invited talks.

An overview of research activities (publications, talks, research projects, supervision of PhD students, research stays, etc.) is given in the attached document *Research activities* (appendix 1).

Teaching experience and (scientific) services

- Several exercise classes in the period 2000-2010.
- At Ghent University I have been responsible (as lecturer or co-lecturer) for the courses Computer Algebra (since 2007), Capita Selecta in Geometry (spring 2010), Computational Group Theory (spring 2010 and 2012), Coding Theory (fall 2010, 2011, and 2012), Relations and Structures (2012 and 2013) and Discrete Mathematics I (2014). At the Vrije Universiteit Brussel I have been responsible for the courses Linear Algebra (fall 2012 and spring 2016), Analysis (part II) (fall 2013, 2015, 2016), Introduction to Group Theory (spring 2016) and Algebra II (rings and modules) (fall 2016).
- Supervision of master theses and bachelor projects
- referee and reviewing work, organization of conferences, committee work.

An overview of all teaching activities (teaching and supervision of master theses) and relevant (scientific) service work is given in the attached document *Teaching activities* (appendix 2) and *Services* (appendix 3).

Language skills

| | |
|-------------------------------------|------------------------------------|
| Dutch: native | French: good, spoken and written |
| English: fluent, spoken and written | German: good spoken, basic written |

Technical skills

Experience with mathematical software, such as GAP, MAGMA, Maple, Sage. Experience with operating systems: Linux, (Mac)OSX, Windows, experience with setup and maintenance of servers. Experience with setup of TCP-IP networks. Experience with commonly used office software. Some experience with High Performance Computing, particularly the use of (Open)Mosix.

APPENDIX 1: RESEARCH ACTIVITIES

PhD-thesis

Blocking sets and partial spreads in finite polar spaces, defended May 18th, 2004.
(<http://homepages.vub.ac.be/~jdbeule/pdfs/phdthesis.pdf>)

Brief description of research activities

- **Stability questions.** A stability theorem states that a nearly extremal object can be obtained from an extremal one by “small” changes. Many research questions on substructures of finite geometries are stability questions. Stability questions on minimal blocking sets and maximal partial spreads of finite classical polar spaces have been investigated. Related problems, such as the construction of extremal examples have received attention.
- **Characterization results.** We call a (set of) geometric properties of a class \mathcal{C} of objects a *characterization* for \mathcal{C} if all objects in \mathcal{C} satisfy the geometric properties. Characterization results of particular *multiple weighted blocking sets* of finite Desarguesian projective spaces were obtained. Such results have direct implications for linear codes meeting the Griessmer bound.
- **Algebraic techniques.** The *polynomial method* is the use of a so-called lacunary polynomial to study directions problems in the finite Desarguesian affine plane. The method can be used to study comparable problems in finite Desarguesian affine spaces, and this approach led to new results on particular substructures of finite classical polar spaces.
- **MDS-conjecture.** Recently, progress was obtained towards the so-called MDS-conjecture, a classical question from coding theory which, for linear MDS codes, translates completely to a problem on *arcs*, i.e. particular substructures of a finite Desarguesian projective space. Apart from the progress on the problem itself, we plan the investigation of the used algebraic methodology on other geometrical problems.

Publications

Peer reviewed publications

- [1] M. R. Brown, J. De Beule, and L. Storme. Maximal partial spreads of $T_2(\mathcal{O})$ and $T_3(\mathcal{O})$. *European J. Combin.*, 24(1):73–84, 2003.
- [2] J. De Beule and L. Storme. The smallest minimal blocking sets of $Q(6, q)$, q even. *J. Combin. Des.*, 11(4):290–303, 2003.
- [3] J. De Beule, A. Hoogewijs, and L. Storme. On the size of minimal blocking sets of $Q(4, q)$, for $q = 5, 7$. *SIGSAM Bull.*, 38(3):67–84, 2004.
- [4] J. De Beule and K. Metsch. Small point sets that meet all generators of $Q(2n, p)$, $p > 3$ prime. *J. Combin. Theory Ser. A*, 106(2):327–333, 2004.
- [5] J. De Beule and K. Metsch. Minimal blocking sets of size $q^2 + 2$ of $Q(4, q)$, q an odd prime, do not exist. *Finite Fields Appl.*, 11(2):305–315, 2005.

- [6] J. De Beule and K. Metsch. The smallest point sets that meet all generators of $H(2n, q^2)$. *Discrete Math.*, 294(1-2):75–81, 2005.
- [7] J. De Beule and L. Storme. On the smallest minimal blocking sets of $Q(2n, q)$, for q an odd prime. *Discrete Math.*, 294(1-2):83–107, 2005.
- [8] J. De Beule and K. Metsch. The hermitian variety $H(5, 4)$ has no ovoid. *Bull. Belg. Math. Soc. Simon Stevin*, 12(5):727–733, 2005.
- [9] J. De Beule and L. Storme. The two smallest minimal blocking sets of $Q(2n, 3)$, $n \geq 3$. *Bull. Belg. Math. Soc. Simon Stevin*, 12(5):735–742, 2005.
- [10] J. De Beule and L. Storme. Blocking all generators of $Q^+(2n + 1, 3)$, $n \geq 4$. *Des. Codes Cryptogr.*, 39(3):323–333, 2006.
- [11] J. De Beule and K. Metsch. The maximum size of a partial spread in $H(5, q^2)$ is $q^3 + 1$. *J. Combin. Theory Ser. A*, 114(4):761–768, 2007.
- [12] J. De Beule, K. Metsch and L. Storme. Characterization results on small blocking sets of the polar spaces $Q^+(2n + 1, 2)$ and $Q^+(2n + 1, 3)$. *Des. Codes Cryptogr.*, 44(1-3):197–207, 2007.
- [13] J. De Beule and A. Gács. Complete arcs on the parabolic quadric $Q(4, q)$. *Finite Fields Appl.*, 14(1):14–21, 2008.
- [14] J. De Beule, A. Klein, K. Metsch and L. Storme. Partial ovoids and partial spreads in hermitian polar spaces. *Des. Codes Cryptogr.*, 47(1-3):21–34, 2008.
- [15] J. De Beule, A. Hallez and L. Storme. A non-existence result on Cameron-Liebler line classes. *J. Combin. Des.*, 16(4):342–349, 2008
- [16] J. De Beule, A. Klein, K. Metsch and L. Storme. Partial ovoids and partial spreads in symplectic and orthogonal polar spaces. *European J. Combin.*, 29(5):1280–1297, 2008.
- [17] J. De Beule, K. Metsch and L. Storme. Characterization results on arbitrary non-weighted minihypers and on linear codes meeting the Griesmer bound. *Des. Codes Cryptogr.*, 49(1-3):187–197, 2008.
- [18] J. De Beule, K. Metsch and L. Storme. Characterization results on arbitrary weighted minihypers and on linear codes meeting the Griesmer bound. *Adv. Math. Comm.*, 2(3):261–272, 2008.
- [19] J. De Beule, A. Klein, K. Metsch and L. Storme. Partial ovoids and partial spreads of classical finite polar spaces. *Serdica Math. J.*, 34:689–714, 2008.
- [20] J. De Beule, A. Hallez, P. Govaerts and L. Storme. Tight sets, weighted m -covers and their links to minihypers. *Des. Codes Cryptogr.*, 50(2):187–201, 2009.
- [21] A. De Vos, J. De Beule and L. Storme. Computing with the square root of NOT. *Serdica Comput. J.*, 3(4):359–370, 2009.
- [22] J. De Beule, A. Hallez, and L. Storme. A characterization result on a particular class of non-weighted minihypers. *Des. Codes Cryptogr.*, 63(2):187–201, 2012.

- [23] S. Ball, and J. De Beule. On sets of vectors of a finite vector space in which every subset of basis size is a basis II. *Des. Codes Cryptogr.*, 65(1–2):5–14, 2012.
- [24] K. Coolsaet, J. De Beule, and A. Siciliano. The known maximal partial ovoids of size $q^2 - 1$ of $Q(4, q)$. *J. Combin. Des.*, 21(3):89–100, 2013.
- [25] J. De Beule. On large maximal partial ovoids of the parabolic quadric $Q(4, q)$. *Des. Codes Cryptogr.*, 68(1–3):3–10, 2013
- [26] J. De Beule, A. Hallez, K. Metsch, and L. Storme. Sets of generators blocking all generators in finite classical polar spaces. *J. Combin. Theory Ser. A*, 120(2):318–339, 2013.
- [27] J. De Beule, P. Sziklai, and M. Takáts. On the structure of the directions not determined by a large ane point set. *J. Algebr. Combin.*, 38(4): 889–899, 2013.
- [28] J. De Beule, J. Demeyer, K. Metsch, and M. Rodgers A new family of tight sets in $Q^+(5, q)$ *Des. Codes Cryptogr.*, 78(3):655–678, 2016
- [29] J. De Beule, T. Héger, T. Szőnyi, and G. Van de Voorde Blocking and double blocking sets in finite planes *Electronic. J. Combinatorics.*, 23(2), 2016 P2.5, 2016
- [30] J. Bamberg, J. De Beule, F. Ihringer New non-existence proofs for ovoids of Hermitian polar spaces and hyperbolic quadrics *Annals of Combinatorics*, to appear.

Chapters in books

- [1] J. De Beule, A. Klein, and K. Metsch. Substructures of finite classical polar spaces. In *Current research topics in Galois geometry*, Mathematics Research Developments, chapter 2, pages 35–61. NOVA Sci. Publ., New York, 2012.

Conference proceedings

- [1] A. De Vos, M. Boes and J. De Beule. Almost-classical quantum computers. Proceedings of the *9th International Workshop on Boolean Problems (2010)*, 51 – 56 ISBN 978-3-86012-404-8
- [2] J. De Beule. Direction problems in affine spaces. Proceedings of the *Academy contact forum on Galois geometries and applications*, 79 – 94. Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten, Brussels, 2014. ISBN 978-90-6569-140-8.

Edited works

- [1] J. De Beule, Y. Edel, E. Käsper, A. Klein, S. Nikova, B. Preneel, J. Schillewaert and L. Storme, Eds., Proceedings of the international conference *Galois geometries and applications, Ghent, Belgium (May 25-29, 2009)*. *Des. Codes Cryptogr.* **56** (2010), 85-248.
- [2] J. De Beule and L. Storme, Eds., *Current research topics in Galois geometry*. NOVA Sci. Publ., 2012, New York. ISBN: 978-1-61209-523-3
- [3] J. Bamberg, J. De Beule, N. Durante and M. Lavrauw, Eds., Editorial: Special issue on finite geometries in honor of Frank De Clerck. *Des. Codes Cryptogr.* **72** (2014), 1–5.

Software related to research

- [1] J. Bamberg and J. De Beule. Forms – Sesquilinear and Quadratic forms in GAP. current verion: 1.2.1. website: <http://cage.ugent.be/geometry/forms.php> accepted (in 2009) by the GAP council: <http://www.gap-system.org/Packages/forms.html>
- [2] J. Bamberg, A. Betten, Ph. Cara, J. De Beule, M. Lavrauw, and M. Neunhöffer. FinInG – Finite Incidence Geometry. submitted to tha GAP-council for formal refereeing. <http://cage.ugent.be/fining>
- [3] J. De Beule, J. Jonušas, J. D. Mitchell, M. Torpey, and W. Wilson, Digraphs - GAP package, Version 0.4.2, January 2016. <http://www-groups.mcs.st-andrews.ac.uk/~jamesm/digraphs.php>

Supervision of PhD students

- Miroslava Cimráková. Search Algorithms for substructures in generalized quadrangles, supervisor: Veerle Fack, co-supervisor: Jan De Beule. PhD successfully defended on May 19th, 2006.
- Anja Hallez. Linear codes and blocking structures from finite projective and polar spaces. Supervisors: Jan De Beule and Leo Storme. PhD successfully defended on April 26th, 2010.
- Sam Matteus. Blocking sets in polar spaces. Supervisors: Philippe Cara and Jan De Beule. This PhD project will start on October 1st, 2016.

See <http://homepages.vub.ac.be/~jdbeule/research.html#Promotor> for an online version of the theses.

Research visits and stays

short visits (less than 1 month)

- 4/05/03–17/05/03: stay at Mathematisches Institut, Justus Liebig Universität Gießen, Germany.
- 21/03/04–3/04/04: stay at Mathematisches Institut, Justus Liebig Universität Gießen, Germany.
- 8/05/05–21/05/05: stay at Mathematisches Institut, Justus Liebig Universität Gießen, Germany.
- 12/11/06–2/12/06: stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.
- 29/01/07–3/02/07: stay at School of Mathematical Sciences, University College Dublin, Ireland.
- 22/09/08–29/09/08: stay at School of Mathematics and Statistics, Mathematical Institute, University of St. Andrews, St. Andrews, Scotland, UK.

- 27/10/08–14/11/08: stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.
- 1/12/08–20/12/08: stay at Mathematisches Institut, Justus Liebig Universität Gießen, Germany.
- 10/04/11–16/04/11: stay at Dipartimento di Tecnica e Gestione dei Sistemi Industriali (DTG) a Vicenza, Università degli Studi di Padova, Vicenza, Italy.
- 18/09/11–24/09/11: stay at Dipartimento di Tecnica e Gestione dei Sistemi Industriali (DTG) a Vicenza, Università degli Studi di Padova, Vicenza, Italy.
- 11/12/11–18/12/11: stay at Dipartimento di Tecnica e Gestione dei Sistemi Industriali (DTG) a Vicenza, Università degli Studi di Padova, Vicenza, Italy.
- 01/04/12–12/05/12 : stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.
- 14/05/12–21/05/12 : stay at Università degli Studi di Napoli Federico II, Naples, Italy.
- 16/03/14–29/03/14: stay at Dipartimento di Tecnica e Gestione dei Sistemi Industriali (DTG) a Vicenza, Università degli Studi di Padova, Vicenza, Italy.
- 16/11/14–29/11/14 : stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.
- 15/02/15–28/02/15 : stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.
- 19/04/15–01/05/15: stay at Department of applied mathematics, Faculty of electrical engineering and computing, University of Zagreb, Zagreb, Croatia
- 10/01/16–23/01/16: stay at School of Mathematics and Statistics, Mathematical Institute, University of St. Andrews, St. Andrews, Scotland, UK.
- 22/05/16–28/05/16: stay at Dipartimento di Tecnica e Gestione dei Sistemi Industriali (DTG) a Vicenza, Università degli Studi di Padova, Vicenza, Italy.
- 11/09/16–17/09/16: stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.

research stays (at least 1 month)

- 13/11/05–11/12/05: stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.
- 2/04/06–29/04/06: stay at Mathematisches Institut, Justus Liebig Universität Gießen, Germany.
- 1/02/09–31/05/09: stay at Mathematisches Institut, Justus Liebig Universität Gießen, Germany.

- 01/11/09–12/12/09: stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.
- 06/11/10–19/12/10: stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.
- 01/02/11–31/03/11: stay at Departament de Matemàtica Aplicada IV Universitat Politècnica de Catalunya, Barcelona, Spain.
- 1/05/11–28/05/11: stay at Mathematisches Institut, Justus Liebig Universität Gießen, Germany.
- 01/04/12–12/05/12: stay at Department of Computer Science, Eötvös Loránd University, Budapest, Hungary.
- 03/03/13–10/04/13: stay at Department of Mathematics, University of Western Australia, Perth, Australia.
- 10/05/15–06/06/15: stay at Departament de Matemàtica Aplicada IV Universitat Politècnica de Catalunya, Barcelona, Spain.

Research projects and grants

- *Substructures of polar spaces*. Research project granted by the Research Council of Ghent University. This project was the application for a personal fellowship for three years, which started at 1/10/2004.
- *Substructures in finite projective and polar spaces*. This research project was granted by the Research Council of Ghent University to support a PhD student, Mrs. Anja Hallez. The PhD was defended successfully on April 26th, 2010. Supervisors of the project and PhD were Jan De Beule and Leo Storme.
- *Special point sets in polar spaces, and directions in affine spaces*. This research project was granted by the National Research Foundation (FWO). The project was the application for a personal fellowship for three years, which started at 1/10/2009. The fellowship also includes a personal bench fee of 15000 € for the three years.
- *Applications of (linear) algebra in finite geometry and coding theory*. This research project was granted by the National Research Foundation (FWO). The project was the application for the renewal of my personal fellowship, for three years, which started at 1/10/2012. The renewal includes a personal bench fee of 15000 € for the three years.
- Six of the long research stays (2005, 2006, spring 2009, fall 2010, spring 2011, and spring 2013) were supported by a travel grant of the National Research Foundation. For each grant, a small project has to be submitted and approved. A travel grant is approximately 1500 € per month.
- *A p -adic variant of the polynomial method*. This research project was granted by the National Research Foundation (FWO). It includes a personal research grant of 10000 €. This enables me to invite two guest researchers for a substantial period in Gent to cooperate on particular topics. The project started at 1/01/2014.

- In cooperation with L. Storme and P. Vandendriessche we obtained a grant of 26.000 € to invest in computer infrastructure to support research. This project was granted in June 2014 by the Faculty Research Fund of the Faculty of Sciences of Ghent University.

Talks at national conferences or seminars

- [1] On certain minimal blocking sets of $Q(6, q)$, q even. *UGhent-ULB-VUB seminar on Incidence Geometry*. Ghent, March 1st 2002.
- [2] The smallest minimal blocking sets of $Q(2n + 2, q)$. *UGhent Seminar on Incidence Geometry*. Ghent, November 14th, 2002.
- [3] Minimal blocking sets of size $q^2 + 2$ of $Q(4, q)$, q odd. *UGhent Seminar on Incidence Geometry*. Ghent, April 23th, 2004.
- [4] On maximal partial spreads of $H(5, q^2)$. *UGhent Seminar on Incidence Geometry*. Ghent, January 20th, 2006.
- [5] On maximal partial spreads of Hermitian varieties in odd dimension. *UGhent-ULB-VUB seminar on Incidence Geometry*. Brussels, March 8th, 2007.
- [6] On maximal partial ovoids and maximal partial spreads of finite classical polar spaces. *UGhent Seminar on Incidence Geometry*. Ghent, March, 16th, 2007.
- [7] Existence and a characterisation of maximal partial ovoids of $Q(4, q)$. *UGhent Seminar on Incidence Geometry*. Ghent, May 15th, 2009.
- [8] The polynomial method in Galois geometry. *UGent Seminar on Incidence Geometry*. Gent, 28 januari 2011.

Talks at international conferences or foreign universities

Abstracts and slides can be found at <http://homepages.vub.ac.be/~jdbeule/talks.html>.

- [1] Maximal partial spreads of $T_2(\mathcal{O})$. *18th British Combinatorial Conference*. Brighton, Sussex, United Kingdom, 1–6 July 2001.
- [2] The smallest minimal blocking sets of $Q(6, q)$, q even. *Combinatorics 2002*. Pianeta Maratea, Maratea, Italy, 2–8 June 2002.
- [3] The smallest minimal blocking sets of $Q(2n, q)$, for some n and q . *Geometric and Algebraic Combinatorics 2*. Oisterwijk, The Netherlands, 11–16 August 2002.
- [4] An application of $\{\delta(q + 1), \delta; n + 1, q\}$ -minihypers on generalized quadrangles. *Eight International Workshop on Algebraic and Combinatorial Coding Theory (ACCT-VIII)*. Tsarskoe Selo (Pushkin), Saint Petersburg, Russia, 8 - 14 September 2002.
- [5] The smallest minimal blocking sets of $Q(2n, q)$, for small odd q . *EIDMA 2002 Symposium..* Mierlo, Eindhoven, The Netherlands, 21 and 22 November 2002

- [6] The smallest minimal blocking sets of $Q(2n, q)$, for small odd q *Finite Geometries 2003*. Irsee, Germany, 16 – 21 February 2003
- [7] Minimal t -covers and maximal partial t -spreads of polar spaces. *19th British Combinatorial Conference*. Bangor, Wales, United Kingdom, 29 June – 4 July 2003.
- [8] The smallest sets of points meeting all generators of $H(2n, q^2)$, $n > 1$. *EIDMA 2003 Symposium*. Mierlo, Eindhoven, The Netherlands, 13 and 14 November 2003.
- [9] The smallest sets of points meeting all generators of $H(2n, q^2)$, $n > 1$. *Workshop Blocking sets of projective and polar spaces*. Università degli Studi di Napoli Federico II, Naples, Italy, 22–29 February 2004.
- [10] The smallest minimal blocking sets of $Q(2n, q)$, q odd prime. *Seminar finite geometry*. Università degli Studi della Basilicata, Potenza, Italy, 1 and 2 March 2004.
- [11] Minimal blocking sets of size $q^2 + 2$ of $Q(4, q)$, q an odd prime, do not exist. *Incidence Geometry, International Conference at La Roche*. La Roche en Ardenne, Belgium, 23–29 May 2004.
- [12] The Hermitian variety $H(5, 4)$ has no ovoids. *EIDMA 2004 Symposium*. Mierlo, Eindhoven, The Netherlands, 25 and 26 November 2004.
- [13] On small minimal blocking sets of $Q(4, q)$, q odd. *EIDMA Seminar Combinatorial Theory*. Technische Universiteit Eindhoven, Eindhoven, The Netherlands, March 16th, 2005.
- [14] The Hermitian variety $H(5, 4)$ has no ovoids. *ALCOMA05*. Thurnau, Germany, 3–10 April 2005.
- [15] Classification results on weighted minihypers. *Fourth International Workshop on Optimal Codes and related topics*. Pamporovo, Bulgaria, 17–23 August 2005.
- [16] The smallest minimal blocking sets of $Q^+(2n + 1, q)$, $q = 2, 3, 4$. *Geometric and Algebraic Combinatorics 3*. Oisterwijk, The Netherlands, 14–19 August 2005.
- [17] On maximal partial spreads of Hermitian varieties. *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, November 18th, 2005.
- [18] Large maximal partial spreads of the Hermitian variety $H(5, q^2)$. *Combinatorics 2006*. Ischia (Naples), Italy, 25 June – 1 July 2006.
- [19] Non-existence of maximal partial ovoids of $Q(4, q)$, $q = p^h$, $h > 1$, p odd prime, of size $q^2 - 1$. *Finite Geometries 2006*. Irsee, Germany, 10–16 September 2006.
- [20] Maximal partial ovoids and minimal blocking sets of generalized quadrangles I, II and III. (three lectures). *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, November 17th, November 25th, and December 1st, 2006.
- [21] Algebraic techniques in finite geometry: a case study. *Algebra seminar at UCD*. University College Dublin, Ireland, January 29th, 2007.

- [22] Characterization results on arbitrary (weighted) minihypers and on linear codes meeting the Griesmer bound. *Seminar at Claude Shannon Institute*. Claude Shannon Institute for Discrete Mathematics, Coding and Cryptography, Dublin, Ireland, January 31st, 2007.
- [23] Characterization of certain weighted t -fold blocking sets, and an application. *Combinatorics 2008*. Costermano (Garda), Italy, 20 June – 28 June 2008.
- [24] Lower and upper bounds of maximal partial ovoids of orthogonal polar spaces. *Geometric and Algebraic Combinatorics 4*. Oisterwijk, The Netherlands, 17–22 August 2008.
- [25] Particular facts about finite classical generalized quadrangles. *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, November 7th, 2008.
- [26] Maximal partial ovoids of the generalized quadrangle $Q(4, q)$. *22nd British Combinatorial Conference*. St. Andrews, Fife, United Kingdom, 5–10 July 2009
- [27] (Partial) ovoids and (partial) m -ovoids of $Q^-(5, q)$. *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, November 13th, 2009.
- [28] Maximal partial ovoids of $Q(4, q)$ of size $q^2 - 1$: an update. *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, November 20th, 2009.
- [29] On maximal partials spreads of the hermitian variety $H(3, q^2)$. *ALCOMA10*. Thurnau, Germany, 11–18 April 2010.
- [30] Point sets in $AG(n, q)$ (not) determining certain directions. (invited talk) *Baer Colloquium*. Ghent, June 12th, 2010.
- [31] Small $(n - 1)$ -covers of the polar spaces $Q^+(2n + 1, q)$ and $H(2n + 1, q^2)$ *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Boedapest, Hongarije, November 12th, 2010.
- [32] Some stability theorems in finite geometry. *Graph theory seminar*. Universitat Politècnica de Catalunya, Barcelona, Spanje, March 3rd, 2011.
- [33] Maximal partial ovoids of $Q(4, q)$, directions in $AG(3, q)$ and subgroups of $SL(2, q)$. *Algebra and geometry seminar*. Gießen, May 12th, 2011.
- [34] On the structure of the directions not determined by large affine point sets. *Finite Geometries 2011*. Irsee, Duitsland, 19–25 June 2011.
- [35] FinInG – a share package for GAP *Geometry Seminar Vicenza* Vicenza, Italy, December 12th, 2011.
- [36] Old and new results on the MDS-conjecture. *Incidence Geometry and Building 2012* Gent, Belgium, 6–10 February 2012.
- [37] On Cameron-Liebler line classes with large parameter *Giornate di geometria* Vicenza, Italy, 12–14 February 2012.
- [38] On (recent) results towards the MDS-conjecture. *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, 13 April 2012.

- [39] Cameron-Liebler line classes in $PG(3, q)$. *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, 27 April 2012.
- [40] Old and recent results on linear MDS codes. *Seminar on finite geometry at Università degli Studi di Napoli Federico II* Università degli Studi di Napoli Federico II, Naples, Italy, 17 May 2012.
- [41] Direction problems in affine spaces. (invited talk). First joint conference of the Belgian, Royal Spanish and Luxembourg Mathematical Societies Liège, Belgium, 6-7-8 June, 2012.
- [42] Characterising point sets in $AG(3, q)$ from intersection numbers *Combinatorics 2012* Perugia, Italy, 11 – 15 September 2012.
- [43] Direction problems in affine spaces, related problems, and applications (invited talk). *Academy Contact Forum “Galois geometries and applications”* Brussels, 5 October 2012.
- [44] On Cameron-Liebler line classes with large parameter. *CanADAM 2013 (Canadian conference on Discrete and Algorithmic Mathematics)* St. John’s, NL, Canada, 10 –16 June 2013.
- [45] Segre’s lemma of tangents and linear MDS codes (invited talk). *Journées estivales de la méthode polynomiale* Lille, France, 24 – 27 June 2013.
- [46] On Cameron-Liebler line classes with large parameter. *The 11th International Conference on Finite Fields and their Applications* Magdeburg, Germany, 22–26 July 2013.
- [47] Do i -tight sets and m -ovoids hate each other? *Workshop on Galois geometries and its applications* Pécs, Hungary, 16 and 17 April 2014.
- [48] Cameron-Liebler line classes. *Combinatorics 2014* Gaeta, Italy, 1 – 6 June 2014.
- [49] FinInG: a share package for GAP. *Finite geometries: Fourth Irsee Conference* Irsee, Germany, 14 – 20 September 2014.
- [50] Cameron-Liebler line classes. *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, November 21st, 2014.
- [51] FinInG: a share package for GAP. *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, November 25th, 2014.
- [52] Point sets from strongly regular graphs. *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, February 27th, 2015.
- [53] Tight sets in finite geometry (invited talk) *ALCOMA15*. Banz, Germany, 15 – 20 March 2015.
- [54] Old and recent results on the linear MDS conjecture. *Seminar of the department of applied mathematics*. University of Zagreb, Zagreb, April 24th, 2015.
- [55] Strongly regular graphs and substructures of finite classical polar spaces. *8th Slovenian International Conference on Graph Theory*. Kransjka Gora, Zagreb, 21 – 27 June, 2015.
- [56] FinInG – Finite Incidence Geometry in GAP *Third GAP days*. Trondheim, Norway, 13 – 23 September 2015.

- [57] On the (linear) MDS Conjecture (invited talk). *Arithmétique en plat pays* Gent, Belgium, October 19 2015.
- [58] Tight sets of Hermtian polar spaces. *Workshop on Galois geometries and its applications* Pécs, Hungary, 5–9 May 2016.
- [59] Arcs in vector spaces and MDS codes (invited talk). *Combinatorics 2016* Maratea, Italy, May 29th – June 4th, 2016.
- [60] (Extending) arcs of vector spaces *Seminar on finite geometries at Eötvös Loránd University*. Eötvös Loránd University, Budapest, Hungary, 16 September 2016.
- Abstract and slides of most talks are available on
<http://homepages.vub.ac.be/~jdbeule/talks.html>

Attended conferences without contributed talk

- Academy Contact Forum “Generalized Polygons”, October 20th, 2000. Royal Flemish Academy of Belgium for Sciences and Arts, Brussels, Belgium
- BMS-DMV meeting, Liège, Belgium, 8,9 and 10 June 2001.
- EIDMA 2001 Symposium, 25 and 26 October 2001, Oostende, Belgium.
- Symposium on Algorithms in Finite Geometry and Combinatorics. Research group CAAGT, Ghent University, Gent, Belgium, February 28th, 2003.
- 40^e Nederlands mathematisch congres + Belgian mathematical conference. Tilburg, The Netherlands, 16 and 17 April 2004.
- Joint BeNeLuxFra Conference in Mathematics. Ghent University, Gent, Belgium, 19–21 May 2005.
- Academy Contact Forum “Coding theory and cryptography”, 7 October 2005. Royal Flemish Academy of Belgium for Sciences and Arts, Brussels, Belgium
- Academy Contact Forum “Coding theory and cryptography II”, September 21st. Royal Flemish Academy of Belgium for Sciences and Arts, Brussels, Belgium
- Saint Niklaus Conference, 5–6–7 December 2009, RWTH, Lehrstuhl D für Mathematik Aachen, Germany.
- Academy Contact Forum “Coding theory and cryptography III”, 25 September 2009. Royal Flemish Academy of Belgium for Sciences and Arts, Brussels, Belgium
- Combinatorics 2010. Verbania, Italy, 2–8 June 2002.
- Geometric and Algebraic Combinatorics 5. Oisterwijk, The Netherlands, 15–19 augustus 2011.
- Trends in Coding Theory. Ascona, Switzerland, 28 oktober – 5 november 2012.
- WCC2013, Bergen, Norway, 15–19 april 2013.
- Workshop on Algebraic Combinatorics, Tilburg, The Netherlands, 17–18 June 2015.

Attended intensive courses

- Socrates intensive course on finite geometry and its applications, 3–14 April 2000, Ghent University, Gent, Belgium.
- EIDMA mini course: New Approaches To Computing Finite Group Invariants, John J. Cannon (University of Sydney), 15–19 April 2002, Université Libre de Bruxelles, Brussels, Belgium.
- Summer School on Finite Groups and Related Geometrical Structures, 28 August – 8 September 2006, Dobbiaco-Toblach, Italy, Gernot Stroth (Simple Groups) and Richard Weiss (Introduction to Spherical and Affine Buildings).

Membership PhD jury

- Miroslava Cimráková (reading and examination committee, Ghent University, 19 May 2006)
- Geertrui Van de Voorde (examination committee, Ghent University, 20 April 2010)
- Anja Hallez (reading and examination committee, Ghent University, 26 April 2010)
- Thomas Maes (reading and examination committee, Ghent University, 30 June 2011)
- Heide Sticker (reading and examination committee, Ghent University, 1 June 2012)
- Cornelia Rößing (reading and examination committee, Ghent University, 26 October 2012)
- Peter Vandendriessche (examination committee, Ghent University, 24 April 2014)
- Sara Rottey (examination committee, Vrije Universiteit Brussel, 15 December 2015)

APPENDIX 2: TEACHING ACTIVITIES

Exercise classes

- 2000–2003 (4 academic years, 1st term): exercises **Analysis I** (22.5 hours) (prof. dr. C. Impens), 1st bachelor mathematics and physics
- 2002–2004 (3 academic years, 1st term): exercises **Analysis III** (22.5 hours) (prof. dr. C. Impens), 2nd bachelor mathematics and 2nd bachelor physics
- 2005–2006 (2 academic years, 2nd term): exercises **Computer Algebra** (15 hours), masters mathematics and masters computer science.
- 2005–2006 (2 academic years, 1st term): exercises **Discrete mathematics** (30 hours) (prof. dr. F. De Clerck), 1^e bachelor informatica
- 2008–2010 (3 academic years, 1st term): exercises **Relations and Structures** (22,5 hours) (prof. dr. F. De Clerck), 1^e bachelor wiskunde

Teaching duties

- 2005–2006 (2 academic years, 2nd term): co-lecturer **Computer Algebra and Computational Group Theory** (15 hours) (lecturer: prof. dr. A. Hoogewijs), masters mathematics.
- 2007 (2nd term): co-lecturer **Capita Selecta in Geometry** (15 hours, elective course masters mathematics) (lecturer prof. dr. L. Storme).
- 2007 (2nd term): lecturer **Computer Algebra** (45 hours), 2nd master mathematics and 2nd master computer science
- 2007–2009 (3 academic years, 1st term): co-lecturer **Computer Algebra**, master mathematics and master mathematical informatics. (22,5 hours) (lecturer: prof. dr. T. De Medts).
- 2009, 2011 (2nd term): co-lecturer **Computational Group Theory**, master mathematics and master mathematical informatics. (15 hours) (lecturer: prof. dr. T. De Medts).
- 2010–2014 (5 academic years, 1st term): lecturer **Computer Algebra**, master mathematics and master mathematical informatics. (22,5 hours) (co-lecturer: dr. J. Demeyer).
- 2010–2013 (3 academic years, 1st term): co-lecturer **Coding Theory** (15 hours) (lecturer: prof. dr. L. Storme), elective course bachelor/master mathematics
- 2012–2014 (2 academic years, 1st term): lecturer **Relations and Structures** (22,5 hours), 1st bachelor mathematics
- 2012 (1st term): lecturer **Linear Algebra** (18 hours), 1st bachelor biology, computer science, geography and chemistry (Free University of Brussels).
- 2013: (1st term) lecturer **Analysis (part II)** (36 hours), 2nd bachelor in engineering sciences: architecture. (Vrije Universiteit Brussel).
- 2014 (1st term): lecturer **Discrete Mathematics I** (30 hours), 1st bachelor mathematics

- 2015: (1st term): lecturer **Analysis (part II)** (36 hours), 2nd bachelor in engineering sciences: architecture. (Vrije Universiteit Brussel).
- 2016: (2nd term): lecturer **Introduction to group theory** (26 hours), 1st bachelor mathematics.
- 2016: (2nd term): lecturer **Linear Algebra** (18 hours), 1st bachelor biology, computer science, geography and chemistry.
- 2016: (1st term): lecturer **Analysis (part II)** (36 hours), 2nd bachelor in engineering sciences: architecture. (Vrije Universiteit Brussel).
- 2016: (1st term): lecturer **Rings and modules** (26 hours), 2nd bachelor in mathematics.

Supervision of bachelor projects and master theses

- 2003–2004: Bart Verhaeghe and Stefaan Tavernier (supplementary master in computer sciences). Title (Dutch): “Ontwerp van preprint servers” (“Design of preprint servers”).
- 2004–2005: Zeynep Köse (supplementary master in computer sciences). Title (Dutch): “Optimaliseren van de webstek van het Belgisch Wiskundig Genootschap (BWG)” (“Optimizing the website of the Belgian Mathematical Society”).
- 2004–2006: Peter Lemens (master in mathematics). Title (Dutch): “Projectieve ruimten en GAP: verdere ontwikkeling van het pakket pg” (“Projective spaces and GAP: further development of the package pg”).
- 2005–2006: Anja Hallez (master in mathematics). Title (Dutch): “Verdere ontwikkelingen en toepassingen van het gebruik van GAP in eindige meetkunde”, (“Further developments and applications of the use of GAP in finite geometry”).
- 2005–2006: Ruben Capiiau and Hendrik Vandemoortele (supplementary master in computer sciences). Title (Dutch): “Centraal evaluatie- en rapporteringssysteem voor een middelgrote school” (“Central evaluation and reporting system for a school”).
- 2006–2008: Jeroen Depinois (master in mathematics). Title (Dutch): “Enumeratie van nevenklassen en definiërende relaties van een groep” (“Enumeration of cosets and defining relations of a group”).
- 2013–2014: Serge Vereecken (bachelor project in mathematics). Title (Dutch): “Voortbrengende functies” (“Generating functions”).
- 2013–2014: Linda Van Puyvelde (master in mathematics). Title (Dutch) “Algebraïsche grafentheorie: van polaire ruimten tot onderzoekend leren.” (“Algebraic graph theory: from polar spaces to research competences in secondary education.”).
- 2014–2015: Lieve Vandewalle (master in mathematics). “Title (Dutch): “Meetkundige constructies van twee-karakterverzamelingen” (“Geometric constructions of two-character sets”).
- 2014–2015: Tine De Plekker (bachelor project in mathematics). Title (Dutch): “De stelling van Bruck-Ryser” (“The theorem of Bruck-Ryser.”)

Theses 4, 5, 7, 9 en 10 are available on

<http://homepages.vub.ac.be/~jdbeule/teaching.html#Theses>.

APPENDIX 3: SERVICE

Services

Scientific services

- referee, for Journal of Algebraic Combinatorics, Discrete Mathematics, Finite Fields and their Applications, Designs Codes and Cryptography, Innovations in Incidence Geometry, and others
- reviewer for *Mathematical Reviews (AMS)* (<http://www.ams.org/mathscinet>) and *Zentralblatt* (<http://zbmath.org/>), featured reviewer for *Computing Reviews*, (<http://www.computingreviews.com>).
- reviewer for NSA and OTKA.
- member and financial rapporteur of the Management Committee of the COST action IC1104 “Random network coding and designs over $GF(q)$ ”. (http://www.cost.eu/domains_actions/ict/Actions/IC1104).

Organization of conferences

- *Galois Geometries and Applications 2009*, Ghent, 25/5/09 – 29/5/2009, <http://cage.ugent.be/~gga09>
- *Colloquium on Galois Geometry* (Ghent), <http://cage.ugent.be/geometry/cgg/>
- *The 10th International Conference on Finite Fields and their Applications*, Ghent, 11/7/11 – 15/7/11, <http://cage.ugent.be/~fq10>.
- *Conference in Finite Geometries in honour of Frank De Clerck*, Ferrara, Italy, 17 and 18 September 2012, <http://frankconf.wordpress.com/>.
- *COST workshop on Random network codes and designs over $GF(q)$* , Gent, 18–20 september 2013, <http://cage.ugent.be/cost>
- co-organisator van *International Workshop on the Arithmetic of Finite Fields 2016*, Gent, 13–15 juli 2016, <http://cage.ugent.be/waifi>.
- organisator van *Arithmétique en plat pays*, Brussel, 18 april 2016, <http://www.mathconf.org/app-gvl-spring2016>.
- co-organisator van de *special session on computational and combinatorial geometry* at the *second joint Conference of the Belgian, Royal Spanish and Luxembourg Mathematical Societies*, Logroño, La Rioja, Spanje, 5–8 juni 2016, <https://bsl.unirioja.es>
- co-organisator van de *International Workshop on the Arithmetic of Finite Fields 2016*, Gent, 13–15 juli 2016, <http://cage.ugent.be/waifi>.

Outreach and PR activities

- Collaborator for the “Wetenschapsweek” (Science week) (2002, 2004, 2006, 2008) en “Wetenschapsfeest (2008)”. These activities aim at high school students to introduce them to sciences and mathematics. In particular during the “Wetenschapsweek”, one week of activities at university is organized. For mathematics, this includes particular lectures and activities.
- I am co-author of a booklet on elementary number theory and applications for secondary school mathematics (<http://homepages.vub.ac.be/~jdbeule/pdfs/getaltheorie.pdf>). This booklet is published by “Die Keure”, ISBN: 9789048616633.
- The UniMath (University Mathematics) project at Ghent University is an initiative of the mathematics education at Ghent University. It evolved from sending out lecturers to schools to teach six hours on a particular topic to organizing a one-day activity, open to secondary school students who chose for a major program in mathematics. Its objective is to introduce students to some accessible but state of the art topics in mathematics, and to show them the societal impact of mathematics. I am involved in the organization of this activity, and I am one of the lecturers. <http://www.unimath.ugent.be>
- *Wiskunnend Wiske*: <http://www.wiskunnendwiske.be> is an outreach activity focussed on secondary school students. School classes can enroll in the game. In four rounds, they have to solve problems and submit the solution to the university. The solutions are marked, and the best ranked schools are invited for a one day activity at the university, where they have to solve a variety of problems, with a price for the winners. This activity is also meant to improve the image that students and society have about mathematics. I am involved in the organization of this activity.

Committees

I have been member of some hiring committees of assistants in the department. I have been member of the curriculum committee computer sciences.