

Grants:

- FWF Grant M1014-N13 (Austria)
Additive Group Theory and Non-Unique Factorizations
co-PI: A. Geroldinger, D. Grynkiewicz \$464,594 Oct. 2007 – Sep. 2009
- NSF MPS-DRF Grant DMS-0502193 (USA)
New and Classical Ideas in Zero-Sum and Additive Theory
PI: Grynkiewicz \$149,482 Oct. 2005 – Sep. 2007

Publications: Available at www.diambri.org/GrynkPublications

- (1) On some Rado numbers for generalized arithmetic progressions.
Discrete Math., 280 (2004), no. 1-3, 39–50.
- (2) On four color monochromatic sets with nondecreasing diameter.
Discrete Math., 290 (2005), no. 2-3, 165–171.
- (3) On a partition analog of the Cauchy-Davenport Theorem.
Acta Math. Hungar., 107 (2005), no. 1-2, 161–174.
- (4) On four colored sets with nondecreasing diameter and the Erdős-Ginzburg-Ziv Theorem.
J. Combin. Theory Ser. A, 100 (2002), no. 1, 44–60.
- (5) with A. Bialostocki, P. Dierker and M. Lotspeich. On some developments of the Erdős-Ginzburg-Ziv Theorem II.
Acta Arith., 110 (2003), no. 2, 173–184.
- (6) with R. Sabar. Monochromatic and zero-sum sets of nondecreasing modified diameter.
Electron. J. Combin., 13 (2006), no. 1, Research Paper 28, 19 pp.
- (7) with A. Schultz. A five color zero-sum generalization.
Graphs and Combinatorics, 22 (2006), no. 3, 351–360.
- (8) with A. Bialostocki. On the intersection of two m -sets and the Erdős-Ginzburg-Ziv Theorem.
Ars Combin. 83 (2007), 335–339.
- (9) An extension of the Erdős-Ginzburg-Ziv Theorem to hypergraphs.
European J. Combin., 26 (2005), no. 8, 1154–1176.
- (10) Quasi-periodic decompositions and the Kemperman Structure Theorem.
European J. Combin., 26 (2005), no. 5, 559–575.
- (11) A weighted Erdős-Ginzburg-Ziv Theorem.
Combinatorica, 26 (2006), no. 4, 445–453.
- (12) On a conjecture of Hamidoune for subsequence sums.
Integers, 5 (2005), no. 2, A7, 11 pp.
- (13) On the number of m -term zero-sum subsequences.
Acta Arith., 121 (2006), no. 3, 275–298.
- (14) A step beyond the Kemperman Structure Theorem.
Mathematika 55 (2009), 67–114.
- (15) with O. Ordaz, M. T. Varela, and F. Villarroel. On Erdős-Ginzburg-Ziv inverse theorems.
Acta Arith., 129 (2007), no. 4, 307–318.
- (16) with V. Lev, and O. Serra. Connectivity of addition Cayley graphs.
J. Combin. Theory, Ser. B, 99 (2009), 202–217.
- (17) with J. Zhuang. Weighted sequences in finite cyclic groups.
Applied Mathematics E-Notes, 9 (2009), 40–46.
- (18) with E. Marchan, and O. Ordaz. Representation of finite abelian group elements by subsequence sums.
J. Théor. Nombres Bordeaux 21 (2009), no. 3, 559–587.

- (19) with O. Serra. Properties of two dimensional sets with small sumset.
J. Combin. Theory, Ser. A, (2010), no. 2, 164–188.
- (20) with W. D. Gao and A. Geroldinger. Inverse zero-sum problems III.
Acta Arith., 141 (2010), 103–152.
- (21) On extending Pollard’s Theorem for t -representable sums.
Israel J. Math., 177 (2010), no. 1, 413–439,
- (22) with A. Geroldinger. On the arithmetic of Krull monoids with finite Davenport constant.
J. Algebra, 321 (2009), 1256–1284.
- (23) with A. Geroldinger. On the structure of minimal zero-sum sequences with maximal cross number.
Journal of Combinatorics and Number Theory, 1 (2009), no. 2, 109–126.
- (24) with V. Lev. 1-saturating sets, caps, and doubling-critical sets in binary spaces.
SIAM J. Discrete Math., 24 (2010), no. 1, 169-190.
- (25) with I. Bardaji. Long arithmetic progressions in sets with small sumset.
Integers, 10 (2010), 335–350, (electronic) A28.
- (26) with A. Geroldinger and G. J. Schaeffer and W. A. Schmid. On the arithmetic of Krull monoids with infinite cyclic class group.
Journal of Pure and Applied Algebra, 214 (2010), no. 12, 2219–2250.
- (27) with A. Geroldinger and W. A. Schmid. Zero-sum problems with congruence conditions.
Acta Math. Hungar., 131 (2011), no. 4, 323-345.
- (28) with A. Geroldinger and W. A. Schmid. The catenary degree of Krull monoids I.
J. Théor. Nombres Bordeaux, 23 (2011), no. 1, 137-169.
- (29) with E. Marchan and O. Ordaz. A weighted generalization of two theorems of Gao.
Ramanujan J., 28 (2012), no. 3, 323–340.
- (30) Note on a conjecture of Graham.
European J. Combin., 32 (2011), no. 8, 1336-1344.
- (31) with G. A. Freiman, O. Serra and Y. Stanchescu. Inverse additive problems for Minkowski sumsets I.
Collectanea Mathematica, 63 (2012), no. 3, 261–286.
- (32) with G. A. Freiman, O. Serra and Y. Stanchescu. Inverse additive problems for Minkowski sumsets II.
J. Geometric Analysis, 23 (2013), no. 1, 395-414.
- (33) with S. D. Adhikari and Z. H. Sun. On weighted zero-sum sequences.
Advances in Applied Math., 48 (2012), no. 3, 506-527.
- (34) with A. Philipp and V. Ponomarenko. Arithmetic progression weighted subsequence sums.
Israel J. Math., 191 (2013), no. 1, 359–398.
- (35) with A. Geroldinger. The large Davenport constant I: groups with a cyclic, index 2 subgroup.
J. Pure and Applied Algebra, 217 (2013), 863–885.
- (36) with P. Baginski, A. Geroldinger and A. Philipp. Products of two atoms in Krull monoids and arithmetical characterizations of class groups.
European J. Combin., 34 (2013), no. 8, 1244–1268.
- (37) The large Davenport constant II: General upper bounds,
J. Pure and Applied Algebra, 217 (2013), no. 12, 2221–2246.
- (38) with N. R. Baeth, A. Geroldinger, and D. Smertnig. A semigroup-theoretical view of direct-sum decompositions and associated combinatorial problems.
Journal of Algebra and its Applications, 14 (2015), no.2, 1550016, 60 pp.
- (39) with D. Bernstein and C. Yerverger. On three sets with nondecreasing diameter.
Discrete Math., 338 (2015), no. 8, 1328-1344.

- (40) with F. Hennecart. A Weighted zero-sum problem with quadratic residues, *Uniform Distribution Theory*, 10 (2015), no. 1, 69-105
- (41) with A. Geroldinger and Pingzhi Yuan. On Products of k Atoms II. *Mosc. J. Comb. Number Theory*, 5 (2015), no. 3, 3-59.
- (42) with Weidong Gao and Xingwu Xia. On n -Sums in an Abelian Group. *Combinatorics, Probability and Computing*, 25 (2016), no. 3, 419-435.
- (43) with A. Chapman, E. Matzri, L. Rowen, and U. Vishne, Kummer spaces in symbol algebras of prime degree., *J. Pure Appl. Algebra*, 220 (2016), no. 10, 3363-3371.
- (44) with V. Lev. Symmetric Kneser's Theorem with Trios and 3-Transform. *J. Combinatorics and Number Theory*, 7 (2015), no. 3, 191-212
- (45) Planar Subsets with Small Doubling. *Quart. J. Math.* 68 (2017), no. 1, 161-192.
- (46) with S. D. Adhikari, R. Balasubramanian, and S. Eliahou, On the degree of regularity of a particular linear equation. *Acta Arith.* 184 (2018), no. 2, 187–191.
- (47) Iterated Sumsets and Subsequence Sums. *J. Combin. Theory, Ser. A*, 160 (2018), 136–167.
- (48) with S. Adhikari, R. Balasubramanian, and S. Eliahou, A Conjecture of Fox-Kleitman and Additive Combinatorics. Submitted.
- (49) Iterated Sumsets and Setpartitions. Submitted.
- (50) The Index of Small Length Sequence. Submitted.

Books

- (51) *Structural Additive Theory*
Developments in Mathematics 30, Springer (2013), 426 pp.

Teaching Activities

<i>Courses Taught</i>	Course Type	Hours/Week	Location (Year)
Elementary Number Theory	(VO)	3 hr.	U. Memphis (Fall 2018)
Introduction to Graph Theory	(VO)	3 hr.	U. Memphis (Spring 2018)
Topics in Combinatorics	(VO)	3 hr.	U. Memphis (Spring 2018)
Multivariate Calculus	(VO)	4 hr.	U. Memphis (Spring 2018)
Algebraic Graph Theory	(VO)	3 hr.	U. Memphis (Fall 2017)
Foundations of Mathematics	(VO)	3 hr.	U. Memphis (Fall 2017)
Linear Algebra	(VO)	3 hr.	U. Memphis (Spring 2017)
Trigonometry	(VO)	3 hr.	U. Memphis (Spring 2017)
Abstract Algebra	(VO)	3 hr.	U. Memphis (Fall 2016)
Trigonometry	(VO)	3 hr.	U. Memphis (Fall 2016)
Algebraic Theory II	(VO)	3 hr.	U. Memphis (Spring 2016)
Introduction to Graph Theory	(VO)	3 hr.	U. Memphis (Spring 2016)
Algebraic Theory I	(VO)	3 hr.	U. Memphis (Fall 2015)
Foundations of Mathematics	(VO)	3 hr.	U. Memphis (Fall 2015)
Algebraic Theory II	(VO)	3 hr.	U. Memphis (Spring 2015)
Foundations of Mathematics	(VO)	3 hr.	U. Memphis (Spring 2015)
Algebraic Theory I	(VO)	3 hr.	U. Memphis (Fall 2014)
Multivariate Calculus	(VO)	4 hr.	U. Memphis (Fall 2014)
Algebraic Theory II	(VO)	3 hr.	U. Memphis (Spring 2014)
Trigonometry	(VO)	3 hr.	U. Memphis (Spring 2014)
Introductory Topology	(VO)	3 hr.	U. Memphis (Fall 2013)
Additive Combinatorics*	(VO)	4 hr.	U. Graz (2012)
Additive Number Theory*	(VO)	3 hr.	U. Graz (2011)
Algebraic Number Theory	(VO+PS)	4 + 2 hr.	U. Graz (2010)
Commutative Algebra*	(VO+UE)	3 + 1 hr.	U. Graz (2009)
Combinatorial Number Theory*	(SE)	2 hr.	U. Graz (2009)
Additive Number Theory*	(VO)	2 hr.	U. Graz (2008)

VO=Lecture, UE=Exercise Course, PS=Advanced Exercise Course, SE=Student Seminar
 * = Self Designed Course

Graduate Students

- Christopher Worley (Current)

Academic Service

- Referee for the *London Mathematical Society*, *Combinatorica*, *Israel J. Math*, *Forum of Mathematics*, *Fundamenta Mathematicae*, *American Mathematical Monthly*, *J. Combin. Theory*, *Discrete Mathematics*, *Integers*, *Graphs and Combinatorics*, *Electronic J. Combin.*, *Ars Combinatoria*, *Applied Mathematics E-Notes*, *Revista Matemática Iberoamericana*, *Uniform Distribution Theory*, *Acta Arithmetica*, *Combinatorics*, *Probability and Computing*,...
- Proposal Reviewer for the NKFIH (Hungarian National Research, Development and Innovation Office)
- Asked by *Combinatorica* to complete the manuscript “Hyper-atoms applied to the critical pair Theory” submitted by the now deceased Yahya Hamidoune.

- Reviewer for MathSciNet (2003 – Present)
- Faculty Advisor for the Putnam Exam (a national competition for undergraduates) University of Memphis (Fall 2014 – Present)
- Faculty Advisor for the Cantor Sect (Student Math Club) University of Memphis (Fall 2015 – Present)
- Algebra Ph.D. Qualifying Exam University of Memphis (Summer 2014 – Jan. 2016)
- Co-organizer for the annual event “Discover Math Day” designed to attract new math majors (2016–2018)

Committee Work

- Search Committee for the Ralph Faudree Assistant Professorship (2018)
- Ph.D. Committee Member for Kamil Popielarz (2018)
- Ph.D. Committee Member for Julian Sahasrabudhe (2017)
- Ph.D. Committee Member for Scott Binski (2017)
- Prize Committee in charge of awarding the Dr. Ralph Faudree Award (2016)
- Search Committee for the Ralph Faudree Assistant Professorship (2016)
- Ph.D. Graduate Committee (Curriculum, advising, exams, recruitment) (2018–Present)
- Recruitment and Outreach Committee (2017–Present)
- Committee for Web and Newsletter University of Memphis (2014 – Present)
- Undergraduate Committee University of Memphis (2013 – Present)

Invited Talks and Workshops

- Joint International Meeting of the CMS and AMS, Shanghai, June. 2018
Special Session Organizer: *Additive Combinatorics and its Interplay with Factorization Theory*
- Conference on Rings and Factorizations, Graz, Feb. 2018
Plenary Talk: *Finiteness of the Elasticities $\rho_k(G_0)$ Inside a Lattice*
- Combinatorial and Additive Number Theory, Graz, Jan. 2016
Plenary Talk: *The Freiman $3k - 4$ Theorem*
- Additive Combinatorics in Marseille, Sep. 2015.
Short Plenary Talk: *Symmetric Kneser’s Theorem with Trios and 3-transform*
- Joint Meeting of the AMS and MAA, 2015
(AMS) Special Session: *On Sets of Lengths in Krull Monoids.*
- Joint Meeting of the Israel Mathematical Union and the AMS, 2014
Special Session: *The Index of Minimal Zero-Sum Sequences and Kummer Subspaces*
- Joint Meetings of the AMS and MAA, 2013
(AMS) Special Session: *The large Davenport constant for Non-abelian groups*
- Additive Combinatorics in Paris, July 2012
Short Plenary Talk: *Sidon sets and the isoperimetric method*
- Wilsonfest, Caltech, March 2012
Plenary Talk: *Freiman homomorphisms*
- DocCourse in Additive Combinatorics, CRM, Barcelona, Feb. 2008.
Problem Session Course (jointly taught with W. Schmid): *Additive group theory and the theory of non-unique factorizations.*

Other Conferences

- Discrete Mathematics Days, Sevilla, Jul. 2018
Parallel Session: *Iterated Sumsets and Olsons Generalization of the Erdős-Ginzburg-Ziv Theorem.*
- Journées Arithmétiques, Debrecen, July 2015.
Parallel Session: *Pairwise Balanced Designs and Weighted Davenport Constants.*
- Additive and Analytic Combinatorics
Institute for Mathematics and its Applications, Sep. - Oct. 2014
- Erdős Centennial, Budapest, July 2013
- Integers Conference, U. West Georgia, October 2011
Parallel Session: *Freiman homomorphisms*
- Journées Arithmétiques, Vilnius, June 2011
Parallel Session: *On Freiman's $3k - 4$ Theorem in groups of prime order*
- ÖMG + DMV Kongress, Graz 2009
Parallel Session: *On Pollard's Theorem for general abelian groups*
- Journées Arithmétiques, St. Etienne, July 2009.
Parallel Session: *The catenary degree of Krull monoids.*
- Clay-Fields Conference on Additive Combinatorics, Number Theory, and Harmonic Analysis, Toronto, Apr. 2008.
- Eurocomb 2007, Sevilla, Sep. 2007.
Parallel Session: *The connectivity of addition Cayley graphs.*
- Joint Meeting of the AMS and MAA, New Orleans, Jan. 2007.
Parallel Session: *Extending the Freiman $3k - 3$ Theorem to distinct sets.*
- COMBSTRU, Barcelona, Sep. 2006.
- 2nd Meeting of the Czech and Catalan Mathematical Societies, Barcelona, Sep. 2006.
Parallel Session: *On two zero-sum conjectures of Gao, Thangadurai and Zhuan.*
- Rencontres Arithmétique et Combinatoire, St. Etienne, France, 2006.
Parallel Session: *The structure of subsets of an arbitrary abelian group with a small sumset $|A + B| = |A| + |B|$.*
- Workshop and School on Additive Combinatorics, Montreal, Apr. 2006.
- AMS Sectional Meeting, Santa Barbara, 2006.
Parallel Session: *A weighted version of the Erdős-Ginzburg-Ziv Theorem.*
- CANT 2005, New York.
Parallel Session: *The Erdős-Ginzburg-Ziv Theorem in hypergraphs.*
- Integers Conference, U. West Georgia, Oct./Nov. 2003.
Contributed Paper: *On a conjecture of Hamidoune for subsequence sums*
- Mt. Baldy Conference on Applied Algebra and Combinatorics, Claremont, California, 2002.
- Joint Meeting of the AMS and MAA, New Orleans, Jan. 2001.
Parallel Session: *On a conjecture of Bialostocki, Erdős, and Lefmann.*
- MAA Fall Northeastern Section Meeting, Providence, Rhode Island, 2000.
Student Session: *On a conjecture of Bialostocki, Erdős, and Lefmann.*

Invited Seminars

- *Subsequence Sums: Optimal Bounds in the Partition Theorem and the Gao-Olson Generalization of the EGZ Theorem.*
Center for Combinatorics, Nankai U., China, 2018.
- *On the Degree of Regularity of $(x_1 - y_1) + \dots + (x_1 - y_k) = c$.*
U. Graz, 2017.

- *A Zero-Sum Conjecture of Hamidoune.*
U. Mississippi, 2016.
- *The ρ_k Invariants for Finite Abelian Groups.*
University of Graz, Austria, 2015.
- *The Index of Zero-Sum Free Sequences and Kummer Subspaces.*
University of Graz, Austria, 2014.
- *On a Weighted Generalization of Two Theorems of Gao* (6 parts).
Harisch Chandra Research Institute, India, 2010.
- *Extremal examples for the Davenport constant in rank two groups.*
Technical University of Catalunya (UPC), Barcelona, 2008.
- *Sumset bounds for two-dimensional sets.*
U. Delaware, 2008.
- *On the multiplicity of zero-sum subsequences.*
U. Paris VI, 2006.

Departmental Seminars

- *The Freiman $3k - 4$ Theorem*
Institute of Combinatorics, U. Memphis, 2016.
- *Zero-Sums and Polynomials.*
Institute of Combinatorics, U. Memphis, 2016.
- *Zero-Sums and Generalizations of the Erdős-Ginzburg-Ziv Theorem.*
Institute of Combinatorics, U. Memphis, 2016.
- *Sumsets and t -Popular Sums.*
Institute of Combinatorics, U. Memphis, 2016.
- *Sumsets and Homomorphisms.*
Institute of Combinatorics, U. Memphis, 2013.
- *Finite Additive Theory* (3 parts).
U. Graz, 2012.
- *Using arithmetic progressions to weight subsequence sums.*
U. Graz, 2011.
- *Some recent developments in Additive Number Theory* (4 parts).
U. Graz, 2010.
- *Finite sumset questions using infinite sets.*
U. Graz, 2009.
- *Graphs in Additive Combinatorics: large minimal 1-saturating sets* (2 parts).
U. Graz, 2009.
- *Weighted subsequence sums.*
U. Graz, 2008.
- *Multidimensional sumsets* (2 parts).
U. Graz, 2008.
- *Bounds for t -representable sums.*
U. Graz, 2008.
- *Zero-sum combinatorics.*
Technical University of Catalunya (UPC), Barcelona, 2005.
- *A vector space analog of Kneser's Theorem.*
Caltech, 2004.
- *A weighted Erdős-Ginzburg-Ziv Theorem.*
Caltech, 2003.
- *An Erdős-Ginzburg-Ziv Theorem for hypergraphs.*
Caltech, 2003.

- *Zero-sums in sequences of sufficient length and a variation of the Erdős-Ginzburg-Ziv Theorem.*
Caltech, 2002.
- *On sets with nondecreasing modified diameter.*
Invited visitor for the 2002 REU at the U. Idaho.
- *Additive Number Theory.*
Caltech, 2001.
- *Zero-sum Generalized Ramsey Theory: a problem of Bialostocki, Erdős, and Lefmann on sets with nondecreasing diameter.*
Caltech, 2001.

Society Membership

- American Mathematical Society (AMS)

Miscellaneous

- Hand double for the CBS television series *Numb3rs*.