DK: Discrete Mathematics

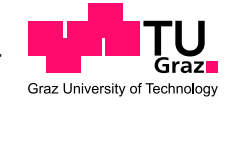## Ecaterina Sava-Huss (coordinator)

NAWI Graz

Doctoral program DK

An intensive PhD training and research program, which involves the threee universities:

- Graz University of Technology
- Karl Franzens University of Graz
- Montan University of Leoben

Primary funding FWF. Currently 14 Ph.D students (10 funded by FWF and 5 associated students), 10 faculty members, 6 associated scientists and 1 coordinator.
Mission and vision of the DK: advanced mathematical education through advanced mathematical research.

Range of Topics

Range of topics comprises:

- Commutative Algebra
- Number Theory
- Discrete Dynamics and Fractals
- Graph Theory
- Combinatorial Group Theory
- Discrete Stochastics
- Combinatorial Optimization and Algorithmic Geometry
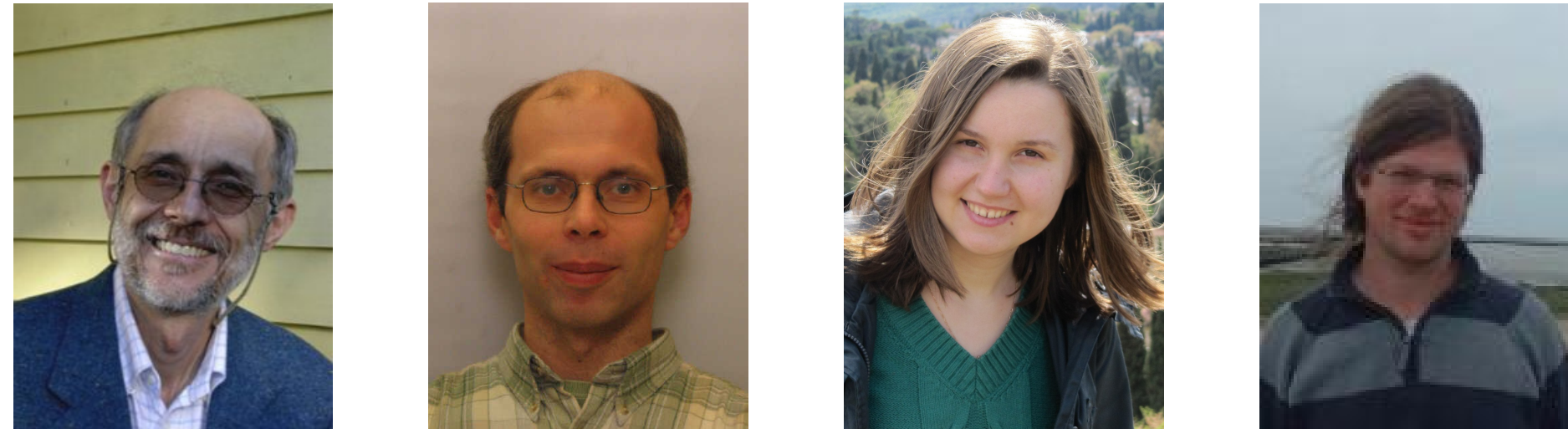- Analysis of Algorithms, Cryptography
- Discrete Geometry

Results

33 DK related publications since 2010; presentations at many international conferences, various other scientific activities, permanent guest program. Selected publications:

- *E.Candellero, L.Gilch, S.Müller*: Branching Random Walks on Free Products of Groups, *Proc. LMS*, (2012).

- *D.Krenn, J.Thuswaldner, V.Ziegler*: On linear combinations of units with bounded coefficients and double-base digit expansions, *Monatshefte für Mathematik* (2012).

- *M.Minervino, J.Thuswaldner*: The geometry of non-unit Pisot substitutions, *submitted*.

- *Z.Franusic, D.Kreso*: Nonextensibility of the pair $\{1,3\}$ to a Diophantine quintuple in $Z[\sqrt{2}]$, *J. Combinatorics and Number Theory*, (2012).

- *J.Cuno, W.Imrich, F. Lehner*, Distinguishing graphs with infinite motion and nonlinear growth, (2012).

- *O.Ebner*: Convergence of refinement schemes on metric spaces, *Proc. AMS*, (2012).

- *D.Smertnig*: On the Davenport constant and group algebras, *Colloq. Math., 121(2)*, (2010).

- *F.Barroero, C.Frei, R.Tichy*: Additive unit representations in rings over global fields - A survey, *Publ. Math. Debr. 79*, (2011).

- *N.Schmuck, S.Wagner, H. Wang*: Greedy trees, caterpillars, and Wiener-type graph invariants, *Math. Comput. Chem., 68(1)*, (2012).

- *C. Temmel*: Shearer's measure and stochastic domination of product measures, *J.Theor.Probab.*, (2012).

- *W.Huss, E. Sava*, Internal aggregation models on comb lattices, *Electron. J. Probab., 17, no. 30*, (2012).

- *A. Geroldinger, P. Yuan*, The set of distances in Krull monoids, *Bull. LMS*, (2012).

- *T. Boiko*, A Blaschke-type condition for subharmonic functions on trees, *preprint*, 2012.

Description: projects and members

P1: Random walk models
W.Woess, F.Lehner, T.Boiko, J.Cuno.

P2: Probabilistic methods in number theory
I.Berkes, A.Bazarova, M. Raseta.

P3: Additive group theory
A.Geroldinger, K.Baur, D.Smertnig.

P4: Fractal analysis and digital expansions
P.Grabner, F.Greinecker.

P5: Digital expansions in cryptography
C.Heuberger, D.Krenn, N.Schmuck.

P6: Polynomial Diophantine equations
P.Kirschenhofer, M.Weitzer.

P7: Combinatorial optimisation problems
B.Klinz, M.Kang, A.Custic.

P8: Number systems and fractal structures
J.Thuswaldner, M.Minervino.

P9: Diophantine approximation
R.Tichy, C.Elsholtz, F.Barroero,D.Kreso.
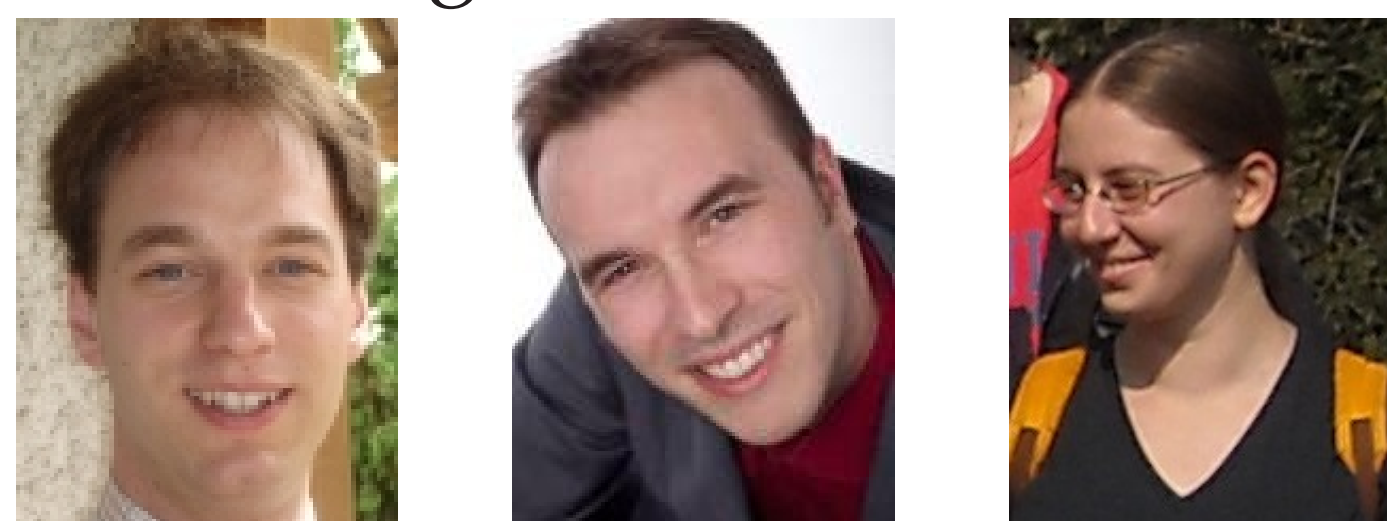
P10: Subdivision in nonlinear geometries
J.Wallner, O.Ebner, F.Lehner.

DK coordinator: E.Sava-Huss

Joint scientific activities in DK: Advanced Topics in Discrete Mathematics every semester; the mini-conference Discrete Mathematics Day once a year; weekly joint seminars for the DK members; joint mentoring. E.Candellero, C.Frei, O.Ebner and C.Temmel (all DK associated) obtained the Ph.D degree within DK; now holding Postdoc positions abroad.

FWF — TU Graz, Graz University of Technology — UNI GRAZ — MONTAN UNIVERSITÄT

www.math.tugraz.at/~discrete