Algebra, Analysis, and Aperiodic Order

12–16 August 2024

Faculty of Mathematics
Bielefeld University

This workshop is part of the DFG-funded
CRC 1283: *Taming uncertainty and profiting from randomness and low regularity in analysis, stochastics and their applications*
and TRR 358: *Integral structures in geometry and representation theory*

at Bielefeld University

Organisers: David Damanik, Neil Mañibo, Nicolae Strungaru

www.math.uni-bielefeld.de/∼jmazac/conf/aaao.html

Schedule: Monday, 12 August 2024

Lecture Hall: **H3, university main hall**

09:00 – 10:00	**Registration**
10:00 – 11:00	**Lorenzo Sadun** (University of Texas at Austin) How big is a tiling's return module?
11:00 – 11:30	**Coffee break**
11:30 – 12:30	**Christoph Richard** (University of Erlangen-Nürnberg) Which Meyer sets are regular model sets? A characterisation via almost periodicity
12:30 – 14:00	**Lunch**
14:00 – 15:00	**John A. G. Roberts** (University of New South Wales) Arithmetic and geometric aspects of the (symbolic) dynamics of piecewise-linear maps
15:00 – 16:00	**Philipp Gohlke** (Lund University) Orbit separation dimension of primitive inflation tilings
16:00 – 16:30	**Coffee break**
16:30 – 17:30	**Johannes Roth** (University of Stuttgart) Quasicrystals without limits: when symmetry takes over

Schedule: Tuesday, 13 August 2024

Lecture Hall: **H3, university main hall**

10:00 – 11:00	**Christoph Bandt** (University of Greifswald) Topological spaces defined by automata, and the dynamical interior of fractals
11:00 – 11:30	**Coffee break**
11:30 – 12:30	**Mariusz Lemańczyk** (Nicolaus Copernicus University) On Furstenberg systems of some multiplicative functions
12:30 – 14:00	**Lunch**
14:00 – 15:00	**Joanna Kułaga-Przymus** (Nicolaus Copernicus University) $\mathcal{B}$-free systems–what is new?
15:00 – 16:00	**Natalie Frank** (Vassar College) Structure of interval maps representing substitution subshifts
16:00 – 16:30	**Coffee break**
16:30 – 17:30	**Timo Spindeler** (Bielefeld University) Almost periodic properties of Toeplitz shifts
17:30	**Group photo**

Schedule: Wednesday, 14 August 2024

Lecture Hall: **H3, university main hall**

09:00 – 10:00	**Anton Bovier** (University of Bonn) A branching random walk with self repulsion
10:00 – 10:30	**Coffee break**
10:30 – 11:30	**Reem Yassawi** (Queen Mary University of London) Mahler equations for Zeckendorf numeration
11:30 – 12:30	**Dan Rust** (The Open University) Random substitutions and Rauzy measures
12:30 – 14:00	**Lunch**
14:00 – 15:00	**Poster session** in front of lecture hall H3
15:00 –	**Free afternoon** **Group discussions** in room V2-216

Schedule: Thursday, 15 August 2024

Lecture Hall: **H3, university main hall**

10:00 – 11:00	**Ellen Baake** (Bielefeld University) The multiple coupon collection process and Markov embedding
11:00 – 11:30	**Coffee break**
11:30 – 12:30	**Christopher Voll** (Bielefeld University) Combinatorial methods in lattice enumeration
12:30 – 14:00	**Lunch**
14:00 – 15:00	**Dirk Frettlöh** (Bielefeld University) Empty polygons in Penrose tilings and Ammann–Beenker tilings
15:00 – 16:00	**Peter Zeiner** (Xiamen University Malaysia) Counting lattices in $\mathbb{R}^2$ and $\mathbb{R}^3$
16:00 – 16:30	**Coffee break**
16:30 – 17:30	**Jeffrey C. Lagarias** (University of Michigan) An exceptional automorphism, continued fractions and dynamics
18:30 – 21:00	**Conference Dinner**: Restaurant Rosenhof Wiegandweg 49, 33619 Bielefeld

Schedule: Friday, 16 August 2024

Lecture Hall: **H3, university main hall**

10:00 – 11:00	**Ron Lifshitz** (Tel Aviv University) From coincidence in tilings to tiling by near coincidence: Personal intersections with Michael and Franz
11:00 – 11:30	**Coffee break**
11:30 – 12:30	**Bernd Sing** (University of the West Indies at Cave Hill) An assortment of remarkable patterns: Kolakoski, visible lattice points and variants
12:30 – 14:00	**Lunch**
14:00 – 15:00	**Manuel Joseph Loquias** (University of the Philippines–Diliman,) Rational digit systems and discrete-time Fourier transform of functions over lattices and packings
15:00 – 16:00	**Daniel Lenz** (University of Jena) Celebrating Micha, Franz and aperiodic order: a tour of almost periodicity
16:00 –	**Farewell coffee**

Abstracts

Ellen Baake (Bielefeld University)

The multiple coupon collection process and Markov embedding

The embedding problem of Markov transition matrices into Markov semigroups is a classic problem that regained a lot of impetus and activities in the last few years. We consider it here for the following generalisation of the classical coupon collection process: from a set $S = \{1,2,...,m\}$ of distinct types of objects, a subset $K \subseteq S$ is drawn with probability p_K in every time step, $\sum_{K \subseteq S} p_K = 1$, and united with the set of types sampled so far. We obtain explicit conditions for the resulting discrete-time Markov chain to be representable as the semigroup of a continuous-time process. This is joint work with Michael Baake.

Christoph Bandt (University of Greifswald)

Topological spaces defined by automata, and the dynamical interior of fractals

An inflation tile or self-similar set can be represented as a quotient space of a full shift or sofic shift. The corresponding equivalence relation can often be described by a finite-state automaton which was termed neighbor graph. Here we start from the automaton and define an abstract topological space. The method produces a lot of spaces, including all simplicial complexes, certain Julia sets and limit sets of Kleinian groups. This is a complete formalization of geometric substitutions. We show how very complicated topologies can be studied by computer using combinatorial algorithms. The automata do not provide metric properties. For tiles, however, we conjecture that an automata-generated topology can have only one self-similar realization. Dynamical interior is a basic concept connected with the magnification flow of self-similar sets. It can be considered as a discretization of the solenoidal models known from spaces of tilings. The collection of all views or patterns in a self-similar set is organized as a kind of discrete manifold and a Markov chain. This provides new ways to navigate in fractal tilings, and new parameters for their description.

Anton Bovier (University of Bonn)

A branching random walk with self repulsion

We consider a discrete time branching random walk where each particle splits into two at integer times and the offspring move independently by a normal random variable. We introduce a penalty that penalises particles that get within a distance epsilon of each other. We analyse the most likely configurations of particles under the tilted measure for a fixed time horizon N. It turns out that spread very quickly to a distance $2^{\frac{2N}{3}}$ and show a very abrupt change in behaviour at time $\frac{2N}{3}$. This is joint work with Lisa Hartung, Frank den Hollander and Stefan Müller.

Natalie Frank (Vassar College)

Structure of interval maps representing substitution subshifts

A one-dimensional subshift (Σ,σ,μ) generated by a substitution on a finite alphabet can be represented by an exchange of infinitely many intervals $([0,1],\mathcal{F},m)$, where m is Lebesgue measure. We show one way to make such a measure-theoretic conjugacy $\Phi : \Sigma \to [0,1]$ so that $\Phi \circ \sigma = \mathcal{F} \circ \Phi$. We show that the closure of the graph of $\mathcal{F}$ in $[0,1] \times [0,1]$ is a subset of the attractor of a variant of a graph-directed iterated function system.

Given two representations $(\Phi_1,\mathcal{F}_1)$ and $(\Phi_2,\mathcal{F}_2)$, the map $\Psi=\Phi_2\circ\Phi_1^{-1}$ is an almost-everywhere 1:1 map that intertwines $\mathcal{F}_1$ and $\mathcal{F}_2$. The graph of Ψ in $[0,1]\times[0,1]$ is a subset of the attractor of a standard graph-directed iterated function system.

Dirk Frettlöh (Bielefeld University)

Empty polygons in Penrose tilings and Ammann–Beenker tilings

A great number of interesting results have been obtained on empty polytopes in point lattices over the last few decades. A result by Gennadi Averkov connects empty polygons to the Helly number of the underlying set (for instance, the underlying point lattice). Only recently the study of empty polygons in the vertex sets of aperiodic tilings like the Penrose tilings or the Ammann–Beenker tilings was initiated. Here we state the problem and present first results on this topic, which for instance yield exact values for the Helly number of the vertex set of the Penrose tiling.

Philipp Gohlke (Lund University)

Orbit separation dimension of primitive inflation tilings

Dynamical systems obtained from primitive inflations have zero entropy, calling for other topological invariants as a means to classify them. Under appropriate assumptions, primitive inflation tilings exhibit pure point spectrum with continuous eigenfunctions. The orbit separation dimension was initially introduced under the term "amorphic complexity" as a useful topological invariant for such systems. In the context of primitive inflation tilings, we show that its value is often computable from the overlap algorithm – a classical tool to verify that a given primitive inflation rule gives rise to a pure point dynamical system in the first place. (joint work with Michael Baake and Franz Gähler)

Joanna Kułaga-Przymus (Nicolaus Copernicus University)

$\mathcal{B}$-free systems–what is new?

I will give a survey talk on $\mathcal{B}$-free systems, including some recent results on the existence of natural density, joint with Aurelia Dymek and Stanisław Kasjan.

Jeffrey C. Lagarias (University of Michigan)

An exceptional automorphism, continued fractions and dynamics

The group PGL(2,$\mathbb{Z}$) has an "exceptional" outer automorphism of order 2 found by Joan Dyer in the 1970's. (It is unique up to choice of inner automorphism.) This mysterious automorphism, which is explicitly computable, maps some parabolic elements of PGL(2,$\mathbb{Z}$) to hyperbolic elements, which is impossible for inner automorphisms. In general, it maps congruence subgroups of PSL(2,$\mathbb{Z}$) to non-congruence subgroups. In a series of papers, A. Muhammed Uludag and coauthors (especially Hakan Eyral and Bulent Eren Gökman) constructed an almost everywhere defined map **J** taking the extended real line $\widehat{\mathbb{R}}=\mathbb{R}\cup\{\infty\}$ to itself which is intended to intertwine the action of PGL(2,$\mathbb{Z}$) by Möbius transformations with a Dyer automorphism of these transformations on the real axis. They formulated a version of the map **J**, restricted to [0,1], explicitly written down as an action on ordinary continued fractions. The computation of the map at rational numbers (finite continued fractions) uses the Farey tree. The definition at rational numbers induces a map on $\mathbb{R}$ which is continuous at irrational numbers, but is discontinuous at rational numbers. (The map is therefore "indescribable.") They noted it conjugates the dynamical system given by the Farey shift map on [0,1] with absolutely continuous invariant measure to a

"Fibonacci shift" on [0,1] having a singular invariant measure. This talk reports on work revisiting this map and related maps, on the extended real line, concerning their definition. One may ask how the map **J** might fit into a bigger picture in dynamical systems, and whether it might fit in the modular forms landscape as a kind of "period function."

Mariusz Lemańczyk (Nicolaus Copernicus University)

On Furstenberg systems of some multiplicative functions

An arithmetic function $u\colon \mathbb{N}\to\mathbb{C}$ is called multiplicative if $u(mn)=u(m)u(n)$ whenever m and n are coprime. Furstenberg systems associated to bounded multiplicative functions are certain measure preserving systems that encode statistical behavior of u. To describe all such systems is usually a considerable task (for example, the Chowla conjecture from 1965 predicting that the Liouville function has only one Furstenberg system which is the full shift $(\{-1,1\}^{\mathbb{Z}},S)$ considered with the Bernoulli measure $(1/2,1/2)$ is the celebrated open problem). I will concentrate on some recent progress in the classification problem of Furstenberg systems in some selected classes of multiplicative functions (e.g. automatic sequences, general pretentious functions, aperiodic functions introduced by Matomäki, Radziwiłł and Tao in 2015). The talk is based on my joint works with N. Frantzikinakis, A. Gomilko and T. de la Rue.

Daniel Lenz (University of Jena)

Celebrating Micha, Franz and aperiodic order: a tour of almost periodicity

TBA

Ron Lifshitz (Tel Aviv University)

From coincidence in tilings to tiling by near coincidence: Personal intersections with Michael and Franz

I have had the great pleasure of interacting regularly with Franz and Michael for over three decades – ever since my days as a graduate student at Cornell, when Franz taught me how to generate the Penrose tiling using Postscript (!!), through the many years of learning much of what I know about tilings and the mathematics of aperiodic long-range order from Michael, Franz, and I should also mention Uwe. I will give two examples of scientific intersections that I had with Michael and Franz, both revolving around the notion of coincidence. The first, more than 25 years ago, when I studied color symmetry groups in quasicrystals [1], and was enumerating the same submodules that appeared in Michael's work on coincidence site lattices [2-4]. The second, concerns a procedure we have recently formulated to produce quasiperiodic tilings, based on the near-coincidence of pairs of simple tilings [5], rotated or scaled with respect to each other. Here, when rotating a pair or triangular tilings by 30 degrees, we stumbled upon all of Franz's dodecagonal tilings that appeared in his classical work of 1988 [6].

References

[1] R. Lifshitz, "Theory of color symmetry for periodic and quasiperiodic crystals", Rev. Mod. Phys. 69 (1997) 1181–1218.

[2] M. Baake and P. A. B. Pleasants, "Algebraic Solution of the Coincidence Problem in Two and Three Dimensions", Z. Naturforsch. 50a (1995) 711–717.

[3] P. A. B. Pleasants, M. Baake, and J. Roth, "Planar coincidences for N-fold symmetry", J. Math. Phys. 37 (1996) 1029–1058.

[4] M. Baake, "Combinatorial aspects of colour symmetries", J. Phys. A: Math. Gen. 30 (1997) 2687.

[5] M. Ochana and R. Lifshitz, "Tiling by near coincidence", Program of the 15th Int. Conf. on Quasicrystals (Tel Aviv University, 2023) pp. P-21.
[6] F. Gähler, "Crystallography of dodecagonal quasicrystals", `elib.uni-stuttgart.de` (1988).

Manuel Joseph C. Loquias (University of the Philippines–Diliman)

Rational digit systems and discrete-time Fourier transform of functions over lattices and packings

This talk consists of two parts. For the first part, we recall the rational based digit systems of real numbers studied by Akiyama et al. in 2008 and its analogue for formal Laurent series over finite fields by Loquias et al. in 2017. We discuss recent work on these systems, in particular, to a self-affine set corresponding to fractional parts that gives rise to a tiling, and fundamental domains associated to digit representations of formal Laurent series. In addition, we mention preliminary work for an analogue for matrix digit systems.

For the second half of the talk, we introduce the discrete-time Fourier transform (DTFT) of a function over a lattice and a packing. We discuss its construction and properties, in particular, analogues of Parseval's identity, the translation and modulation operators, and an inversion formula. This is based on joint work with Anjelo Gabriel R. Cruz, Alfonso David C. Rodriguez, Jörg Thuswaldner, and Gino Angelo M. Velasco.

Christoph Richard (FAU Erlangen–Nürnberg)

Which Meyer sets are regular model sets? A characterisation via almost periodicity

In 2012, Meyer introduced the notion of an almost periodic pattern and proved that regular model sets are almost periodic patterns. Here we show the converse. Specifically, we show that a Meyer set is a regular model set if and only if it is an almost periodic pattern. This is joint work with Daniel Lenz (Jena) and Nicolae Strungaru (Edmonton).

John A.G. Roberts (University of New South Wales)

Arithmetic and geometric aspects of the (symbolic) dynamics of piecewise-linear maps

We study a family of planar area-preserving maps, which are linear but different on each of the right and left half-planes. Such maps, studied extensively by Lagarias and Rains in 2005, can support periodic and quasiperiodic dynamics with a foliation of the plane by invariant curves. The parameter space is two dimensional and the set of parameters for which an initial condition on the half-plane boundary returns to it are algebraic "critical" curves, determined by the symbolic dynamics of the itinerary between the boundaries. An important component of the planar dynamics is the dynamics it induces on the unit circle – topologically conjugate to rigid rotation – with induced symbolic dynamics and critical curves. We study arithmetic, algebraic, and geometric aspects of the planar and circle (symbolic) dynamics with connections to Farey sequences, continued fraction expansions, quasi-Sturmian irrationals and continuant polynomials. This is joint work with Franco Vivaldi and Asaki Saito.

Johannes Roth (University of Stuttgart)

Quasicrystals without Limits: when Symmetry takes over

The symmetries of quasicrystals are well studied: everybody knows the icosahedron in three dimensions and the n-fold symmetric ones in two dimensions. Maybe also the Elser–Sloane-quasicrystal in four dimensions, based on the hyper-icosahedral symmetry of the 600-cell made of tetrahedra. All of these types can be derived from root lattices and are based on reflection symmetries. Are these all possibilities?

We look for (n,d)-quasicrystals with irreducible symmetries, where n is the crystalline embedding dimension and d is the generalized physical dimension. We discuss quasicrystal symmetries in low dimensions, evaluate the classification of irreducible finite rational matrix groups which lead to higher-dimensional space groups. The atlas of finite groups, the listings of finite (quasi)-simple groups, and last but not least the famous GAP-program are used to produce a preliminary chart of (n,d)-quasicrystals. We also report on a "new" series of symmetries which leads to arbitrary high (n,d)-quasicrystals like the $(n,2)$ cyclotomic quasicrystals. Although our search can never be complete we hope to present some surprising aspects.

Dan Rust (The Open University)

Random substitutions and Rauzy measures

One formulation of the Pisot substitution conjecture can be stated in terms of the so-called Rauzy fractal for the substitution, which is the attractor of a graph-directed iterated function system. Random substitutions generalise substitutions and can be used to interpolate between them, allowing properties of one substitution to inform us of another. In this talk, I'll introduce Rauzy fractals for Pisot random substitutions and results concerning natural measures that can be defined on the attractor, which we call the *Rauzy measure*. By studying Rauzy measures, we're able to prove an analogue of a multi-tiling result for Rauzy fractals but in the random setting, as well as links to S-adic systems, allowing us to identify new criteria for understanding the dynamical spectrum of S-adic systems - in particular, we give a sufficient condition for the spectrum to be pure point for all recurrent directive sequences.

Lorenzo Sadun (University of Texas at Austin)

How big is a tiling's return module?

The rank of a tiling's return module depends on the geometry of its tiles and is not a topological invariant. However, the rank of the first Čech cohomology $\check{H}^1(\Omega)$ gives upper and lower bounds for the size of the return module. For all sufficiently large patches, the rank of the return module is at most the same as the rank of the cohomology. For a generic choice of tile shapes and an arbitrary reference patch, the rank of the return module is at least the rank of $\check{H}^1(\Omega)$. Therefore, for generic tile shapes and sufficiently large patches, the rank of the return module is equal to the rank of $\check{H}^1(\Omega)$. This is joint work with Abigail Perryman.

Bernd Sing (University of the West Indies at Cave Hill)

An assortment of remarkable patterns: Kolakoski, visible lattice points and variants

We will look at some remarkable patterns, their properties and variants thereof: The Oldenburg–Kolakoski sequence is a sequence with alphabet $\{1,2\}$ that equals its own run-length sequence. We will show how this leads to an iterated sequence of matrices that show some self-similarity. The visible lattice points are the points of the square lattice such that the line segment from the origin to the lattice point in question does not contain any lattice point other than these two endpoints. We will look at some variants of this, e.g., what happens if we take the union of the visible lattice points with a translated copy of itself?

Timo Spindeler (Bielefeld University)

Almost periodic properties of Toeplitz shifts

Toeplitz shifts can feature a variety of different properties. For example, they may or may not be uniquely ergodic, they may or may not have a pure point spectrum, they may or may not have eigenfunctions with no continuous representative. In this talk, I will explain how one can use different notions of almost periodicity to characterise Toeplitz shifts that have said properties.

Christopher Voll (Bielefeld University)

Combinatorial methods in lattice enumeration

I will survey combinatorial techniques used in the enumeration of lattices in Euclidean spaces, some old, some new. I will explain, in particular, why it may be worth our while to reinterpret a formula due to Hermite (1851) for the generating series enumerating sublattices of $\mathbb{Z}^n$ in terms of combinatorial formulae going back to Igusa's work on p-adic integrals associated with p-adic matrix groups.

Generalizations of these formulae have recently proved effective in normal subgroup growth of free finitely generated nilpotent groups, representation zeta functions of integral quiver representations, and other lattice enumeration problems. Part of what I have to say is based on recent and ongoing work with Claudia Alfes, Angela Carnevale, Joshua Maglione, and Michael M. Schein.

Reem Yassawi (Queen Mary University of London)

Mahler equations for Zeckendorf numeration

Fixed points of *Pisot* substitutions can be visualised as projections, via a precompact acceptance window, of cut-and-project schemes. Fixed points of constant-length substitutions are projections, along a diagonal, of a two-dimensional array which is the sequence of coefficients of the expansion of a rational function of two variables. In an attempt to understand the relationship between these two results, we define generalised versions of equations of q-Mahler type, which fixed points of constant length-q substitutions satisfy. For simplicity I will focus on substitutions whose characteristic polynomial has the golden mean as leading root. We show that fixed points of these substitutions satisfy a Zeckendorf–Mahler equation, and conversely, that *isolating* Zeckendorf–Mahler equations generate such fixed points. This is joint work with Olivier Carton.

Peter Zeiner (Xiamen University Malaysia)

Counting lattices in $\mathbb{R}^2$ *and* $\mathbb{R}^3$

We count certain integral lattices in $\mathbb{R}^2$ and $\mathbb{R}^3$, or in other words, integral binary and ternary positive definite quadratic forms with certain restrictions. In particular, we consider isometry classes of lattices with a prescribed automorphism group and calculate the asymptotic behaviour of the aggregated class number. We solve this problem for all geometric classes in $\mathbb{R}^2$ and improve the classical result of Minkowski on the asymptotic behaviour of the aggregated class number for isomorphism classes of lattices in $\mathbb{R}^2$ by finding all error terms up to the linear term. We compare our result with a result of Chamizo and Iwaniec who calculated the aggreagated class number for related equivalence classes of integral quadartic forms. In addition, we discuss some results for lattices in $\mathbb{R}^3$.

Participant List

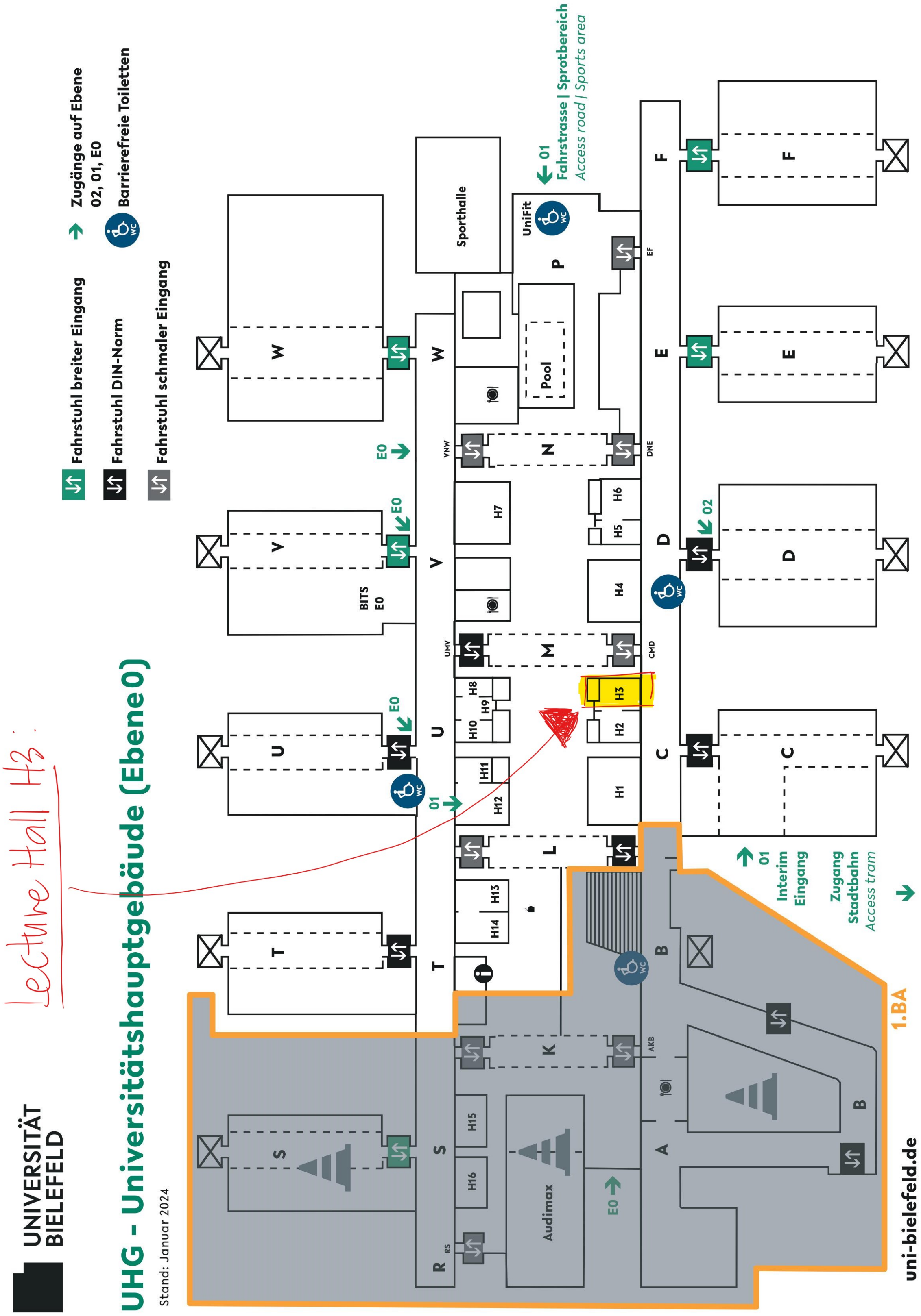
Ibai Aedo	Universidad Pública de Navarra, Spain
Ellen Baake	Bielefeld University, Germany
Michael Baake	Bielefeld University, Germany
Ram Band	Technion - Israel Institute of Technology, Israel
Christoph Bandt	University of Greifswald, Germany
Siegfried Beckus	University of Potsdam, Germany
Anton Bovier	University of Bonn, Germany
Álvaro Bustos-Gajardo	Pontificia Universidad Católica de Chile, Chile
Christopher Cabezas	Université de Liège, Belgium
Karma Dajani	University of Utrecht, the Netherlands
David Damanik	Rice University, USA
Nyah Davis	Rice University, USA
Íris Emilsdóttir	Rice University, USA
Robbert Fokkink	TU Delft, the Netherlands
Natalie Frank	Vassar College, USA
Dirk Frettlöh	Bielefeld University, Germany
Franz Gähler	Bielefeld University, Germany
Philipp Gohlke	Lund University, Sweden
Fabian Gundlach	Paderborn University, Germany
Martin Hansen	University of Derby, UK
Maryam Hosseini	Queen Mary University of London, UK
Gandhar Girish Joshi	The Open University, UK
Johannes Kellendonk	Université Claude Bernard Lyon 1, France
Markus Kirschmer	Paderborn University, Germany
Anna Klick	Bielefeld University, Germany
Jürgen Klüners	Paderborn University, Germany
Emily Korfanty	University of Alberta, Canada
Joanna Kułaga-Przymus	Nicolaus Copernicus University, Poland
Jeffrey Lagarias	University of Michigan, USA
Jeong-Yup Lee	Catholic Kwandong University, South Korea
Mariusz Lemańczyk	Nicolaus Copernicus University, Poland
Daniel Lenz	University of Jena, Germany
Ron Lifshitz	Tel Aviv University, Israel
Manuel Joseph Loquias	University of the Philippines-Diliman, Philippines
Daniel Luz	Bielefeld University, Germany
Neil Mañibo	Bielefeld University, Germany
Jan Mazáč	Bielefeld University, Germany
Eden Miro	Ateneo de Manila University, Philippines
Andrew Mitchell	University of Birmingham, UK
Tomas Reunbrouck	Bielefeld University, Germany
Christoph Richard	University of Erlangen-Nürnberg, Germany
John Roberts	University of New South Wales, Australia
Daniel Roca Gonzalez	Karlsruhe Institute of Technology, Germany
Johannes Roth	University of Stuttgart, Germany
Dan Rust	The Open University, UK
Lorenzo Sadun	University of Texas at Austin, USA

Rudolf Scharlau	TU Dortmund, Germany
Tanja Schindler	Jagiellonian University, Poland/University of Exeter, UK
Daniel Sell	Nicolaus Copernicus University, Poland
Bernd Sing	University of the West Indies at Cave Hill, Barbados
Gilad Sofer	Technion - Israel Institute of Technology, Israel
Timo Spindeler	Bielefeld University, Germany
Petra Staynova	University of Derby, UK
Nicolae Strungaru	MacEwan University, Canada
Lior Tenenbaum	Technion - Israel Institute of Technology, Israel
Yannik Thomas	University of Potsdam, Germany
Christopher Voll	Bielefeld University, Germany
Jamie Walton	University of Nottingham, UK
Reem Yassawi	Queen Mary University of London, UK
Peter Zeiner	Xiamen University, Malaysia

Tram map


StadtBahn-Linien
moBiel
Babenhausen Süd
Voltmannstraße
Koblenzer Straße
Lange Straße
Auf der Hufe
Nordpark
Witte-kind-straße
Schildesche
Heidegärten
Kattenkamp
Deciusstraße
Johannesstift
Sud-brack-straße
Altenhagen
Buschbachtal
Milse
Schelpmilser Weg
Baumheide
Seidenstickerstraße
Schüco
Ziegelstraße
Finkenstraße
Schillerstraße
Stadtheider Straße
Beckhausstraße
Lohmannshof
Wellensiek
Universität
Bültmannshof
Graf-von-Stauffenberg-Straße
Rudolf-Oetker-Halle
Siegfriedplatz
Hauptbahnhof
Jahnplatz
Rathaus
Dürkopp Tor 6
Landgericht
Bethel
Adenauerplatz
Friedrich-List-Straße
Eggeweg
Brackwede Bahnhof
Gaswerkstraße
Normannenstraße
Brackwede Kirche
Windelsbleicher Straße
Rosenhöhe
Sennefriedhof
Senne
August-Bebel-Straße
Teutoburger Straße
Mozartstraße/ Synagoge
Prießallee
Sieker
Marktstraße
Krankenhaus Mitte
Oststraße
Sieker Mitte
Lutherkirche
Roggenkamp
Elpke
Stieghorst Gesamtschule
Stieghorst
www.mobiel.de
① Universität (Bielefeld University)
② Bültmannshof (to the Morgenbreede appartments)
③ Hauptbahnhof (central train station)
④ Jahnplatz (city centre, Comfort-Garni Hotel)
StadtBahn-Linien
1 Schildesche – HBF – Jahnplatz – Bethel – Brackwede – Senne
2 Altenhagen – Milse – HBF – Jahnplatz – Sieker
3 Babenhausen Süd – HBF – Jahnplatz – Dürkopp Tor 6
4 Lohmannshof – Universität – HBF – Jahnplatz – Stieghorst
nicht-barrierefreie Haltestelle
unterirdische Haltestelle
Umsteigemöglichkeit zum Bahnhof
Umsteigemöglichkeit zum Bus
Umsteigemöglichkeit zum Anruf-Sammel-Taxi
Park + Ride · kostenloser Parkplatz für Fahrgäste
Strom-Ladestation für Elektro-Autos
CarSharing-Station
ServiceCenter moBiel
Kundenzentrum Jahnplatz Nr. 5
abschließbare Fahrradbox/-garage
überdachter Fahrradstand
Schließfächer
Toiletten
Radstation
Stand: August 2023

Campus map


lecture Hall H3:
UNIVERSITÄT BIELEFELD
UHG - Universitätshauptgebäude (Ebene 0)
Stand: Januar 2024
Fahrstuhl breiter Eingang
Fahrstuhl DIN-Norm
Fahrstuhl schmaler Eingang
Zugänge auf Ebene 02, 01, E0
Barrierefreie Toiletten
01 Fahrstrasse | Sprotbereich
Access road | Sports area
Sporthalle
UniFit
Pool
BITS E0
H1
H2
H3
H4
H5
H6
H7
H8
H9
H10
H11
H12
H13
H14
H15
H16
Audimax
01 Interim Eingang
Zugang Stadtbahn
Access tram
1.BA
uni-bielefeld.de