DISCRETE GEOMETRIC STRUCTURES 2024

WAI YEUNG LAM (UNIVERSITÉ DU LUXEMBOURG)

KLARA MUNDILOVA (MIT)

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SEPTEMBER 2-6

TU WIEN

NIKLAS AFFOLTER

CHRISTIAN MÜLLER

JAN TECHTER

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Contact us

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Locations

Building:

TU Wien
Freihaus (green area)
Wiedner Hauptstraße 8-10
1040 Vienna

Registration:

H in front of *FH Hörsaal 6* (2nd floor)

Talks:

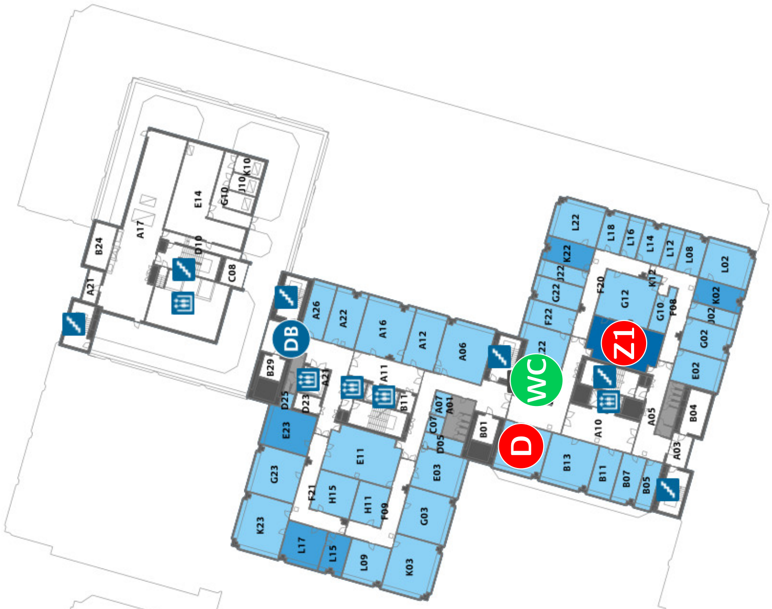
H *FH Hörsaal 6* (2nd floor)

Coffee breaks:

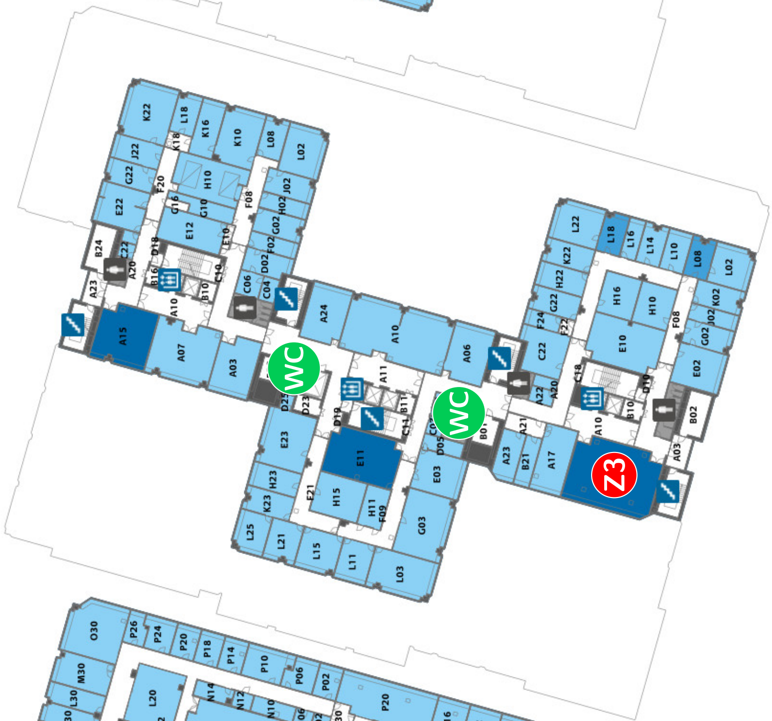
H short coffee break: in front of *FH Hörsaal 6* (2nd floor)
Z3 long coffee break: *Zeichensaal 3* (7th floor)

Rooms for discussions:

D *Dissertantenzimmer* (8th floor)
Z1 *Zeichensaal 1* (8th floor)



8th floor



7th floor

2nd floor

Participants

Niklas Affolter (TU Wien)
Alisher Aikyn (KAUST)
Jaume Alonso (TU Berlin)
Alexey Balitskiy (U Luxembourg)
Cédric Boutillier (Sorbonne Université)
Victor Ceballos Inza (KAUST)
Albert Chern (UCSD)
Felix Dellinger (TU Wien)
Adam Doliwa (UWM)
Alexander Fairley (TU Berlin)
Felix Günther (TU Berlin)
Christian Hafner (ISTA)
Sadashige Ishida (ISTA)
Ivan Izmestiev (TU Wien)
Wai Yeung Lam (U Luxembourg)
Munkyun Lee (The University of Tokyo)
Katrin Leschke (University of Leicester)
Xinye Li (TU Wien)
Marcin Lis (TU Wien)
Paul Melotti (U Paris-Saclay)
Ruzica Mijic (TU Wien)
Christian Müller (TU Wien)
Klara Mundilova (EPFL)
Georg Nawratil (TU Wien)
Yuta Ogata (Kyoto Sangyo University)
Pirahmad Olimjoni (KAUST)
Eleni Pachyli (TU Wien)
Mason Pember (University of Bath)
Linyu Peng (Keio University)
Martin Peternell (TU Wien)
Denis Polly (TU Wien)
Helmut Pottmann (TU Wien/KAUST)
Roman Prosanov (University of Vienna)
Sanjay Ramassamy (U Paris-Saclay)
Anthony Ramos Cisneros (KAUST)
Arvin Rasoulzadeh (TU Wien)
Samara Ren (ISTA)
Florian Rist (KAUST/TU Wien)
Jean-Marc Schlenker (U Luxembourg)
Peter Schröder (CALTECH)
Kiumars Sharifmoghaddam (TU Wien)
Mikhail Skopenkov (KAUST)
Boris Springborn (TU Berlin)
Jannik Steinmeier (TU München)
Yuri Suris (TU Berlin)
Gudrun Szewieczek (TU München)
Jan Techter (TU Berlin)
Amir Vaxman (University of Edinburgh)
Johannes Wallner (TU Graz)
Khusrav Yorov (KAUST)

Abstracts

Monday

Albert Chern (UCSD) Monday 11:00

Penrose's 8-Conic Theorem

Planar projective geometry theorems about the incidence relations among points, lines and conics have continued to fascinate us. In this talk I will present a theorem about eight conics in double contact, discovered by Sir Roger Penrose during his undergraduate years but never published. Imagine a cube graph where each vertex represents a conic, and each edge indicates that the two conics are in double contact. The theorem states that if seven of the eight vertices of the cube are given, then the eighth conic uniquely exists. This theorem encompasses classical theorems such as those of Pappus, Pascal, Brianchon, Monge, Desargues, Poncelet, Neville, Napoleon, and many others. I will sketch three proofs for the theorem: two are reconstructions of Penrose's original elementary proofs, and the third employs the geometry of the five-dimensional projective space of conics. This is joint work with Charles Gunn, Thomas Neukirchner, Russell Arnold, and Sir Roger Penrose.

Linyu Peng (Keio University) Monday 11:30

Discrete moving frames and invariant discrete conservation laws.

Moving frames play a crucial role in analyzing and characterizing geometric structures in both continuous and discrete settings. In this presentation, we will introduce the concept of discrete moving frames and explore their application in computing finite difference invariants. This will be extended to study discrete invariant variational problems. By applying an invariantized version of Noether's theorem, we will illustrate the construction of invariant conservation laws associated with the corresponding discrete Euler-Lagrange equations.

Klara Mundilova (EPFL) Monday 14:00

Art-inspired Curved Crease Origami Research.

Curved crease origami transforms flat materials such as paper into intricate three-dimensional structures by folding along curves. While this discipline is driven primarily by aesthetic exploration, it also offers practical potential for creating functional deployable structures that are cost-efficient to manufacture. In this talk, we show how artistic curved crease origami shapes inspire research into combinations of developable surfaces and their isometric deformations. In addition, we review examples of design software that facilitates the digital fabrication of such shapes.

Kiumars Sharifmoghaddam (TU Wien) Monday 16:00

Rigid-Foldable Origami: Complex Topologies

Rigid-foldable origami, also known as rigid origami, focuses on the kinematics of rigid panels connected by rotational hinges. This field has significant applications in architecture and engineering, where it is traditionally studied by analyzing the local kinematic properties of vertices. The foldability of a mesh is then simulated by optimizing these local properties throughout the mesh.

An alternative approach involves isometrically deformable classes of discrete quad surfaces, which offer a new perspective on the kinematics of rigid origami. By identifying origami patterns that belong to classes such as T-hedra and V-hedra, one can explicitly and globally define a mesh in any folded state by manipulating only a few control polylines. This method not only simplifies the study of rigid origami but also facilitates the construction and rigid folding of generalized and hybrid meshes composed of various patterns. Additionally, it enables the creation of semi-discrete surfaces with developable strips that can undergo rigid ruling deformation.

In this talk, we will begin with foldable planar quad meshes of disc topology and progressively explore more complex topologies, which have broader applications.

Denis Polly (TU Wien) Monday 16:30

Discrete maximal surfaces from s-embeddings

We consider s-embeddings of graphs in the plane, that is, embeddings such that each elementary quadrilateral has an incircle. These nets give rise to discrete congruences of (timelike) spheres in Minkowski space. In this talk we show how, via this connection, certain s-embeddings correspond to members of a class of discrete surfaces that can be considered discretizations of isothermic surfaces, in particular curvature line parametrizations of the (spacelike) unit sphere and maximal surfaces.

Tuesday

Felix Günther (TU Berlin) Tuesday 10:00

Convergence and Symmetry of Discrete Period Matrices

This presentation focuses on an important feature of Riemann surfaces: their period matrices. After providing a short introduction to the linear theory of discrete Riemann surfaces, we introduce the discrete period matrix – a direct analogue to its continuous counterpart. We also have a look at the larger complete discrete period matrix, whose calculation is based on a broader class of discrete holomorphic differentials, thereby giving more information on the underlying discrete Riemann surface.

Mikhail Skopenkov (KAUST) Tuesday 11:00

Solving Euclidean problems by isotropic initialization

Many classical problems in Euclidean differential geometry, such as the construction of flexible or minimal surfaces with desired properties, remain a challenge. We suggest a new general approach to their solution, which is to start with their analogs in isotropic geometry. Isotropic geometry can be viewed as a structure-preserving simplification of Euclidean geometry. The solutions found in the isotropic case give insight and can initialize optimization algorithms to solve the original Euclidean problems.
We illustrate this general approach with three examples: flexible nets, surfaces with a constant angle between asymptotic curves, and webs from asymptotic curves/geodesics. A nondegenerate definition of flexible nets in isotropic geometry has been discovered just recently by Christian Müller and Helmut Pottmann. We characterize such flexible nets of arbitrary size $m \times n$. We get just two classes consisting of special cases of cone nets and Koenigs nets respectively, in contrast to an extremely complicated and still unknown classification of Euclidean flexible nets. Using our nets to initialize optimization, we get new Euclidean mechanisms.
The talk is based on joint works with Caigui Jiang, Olimjon Pirahmad, Helmut Pottmann, and Khusrav Yorov.

Khusrav Yorov (KAUST) Tuesday 14:00

Isotropic Geometry and Applications in Geometric Computing

Initialization is key in optimization problems, especially in geometry. This talk addresses two challenging problems of the geometry of webs, approached through isotropic initialization and numerical optimization. First, we focus on GGG webs, where each family of curves is geodesic. We aim to construct surfaces with non-constant Gaussian curvature that can be approximated by GGG webs using numerical methods. Next, we explore AGAG-webs on negatively curved surfaces, characterized by cyclic arrangements of asymptotic and geodesic curves. The search for a non- trivial discrete AGAG-web remains open, and our approach utilizes isotropic initialization and optimization to tackle this challenge.

Pirahmad Olimjoni (KAUST) Tuesday 14:15

Area-preserving Combescure transformations.

Motivated by the design of flexible nets, we classify all nets of arbitrary size $m \times n$ that admit a continuous family of area-preserving Combescure transformations. There are just two different classes. The nets in the first class are special cases of cone nets that have been recently studied by Kilian, Müller, and Tervooren. The second class consists of Kœnigs nets having a Christoffel dual with the same areas of corresponding faces. We also study the smooth analogs of the introduced classes. We apply isotropic metric duality to get a new class of flexible nets in isotropic geometry. We also get approximate Euclidean mechanisms from isotropic mechanisms by optimization.

Alisher Aikyn (KAUST) Tuesday 14:30

Flexible Kokotsakis meshes with skew faces

In this talk, we will study a class of mechanisms formed by a 3×3 arrangement of rigid quadrilateral faces with revolute joints at the common edges. In contrast to the well-studied Kokotsakis meshes with a quadrangular base, we do not assume the planarity of the quadrilateral faces. These mechanisms are a generalization of Izmestiev's orthodiagonal involutive type of Kokotsakis meshes formed by planar quadrilateral faces. We will discuss the algebraic approach that yields a complete characterization of all flexible 3×3 quad meshes of the orthodiagonal involutive type up to some degenerated cases. We will consider some examples including one that could not be realized using planar faces.

Adam Doliwa (UWM) Tuesday 16:00

Integrable discrete systems, orthogonal polynomials, and quantum walks

We define quantization scheme for discrete-time random walks on the half-line consistent with Szegedy's quantization of finite Markov chains. Our procedure agrees with Szegő map between polynomials orthogonal on the circle and polynomials orthogonal on segment of the real line. It can be applied to arbitrary discrete-time Karlin and McGregor random walks generalizing the so called CGMV method for quantum walks. We illustrate our approach by quantization of random walks obtained from Jacobi orthogonal polynomials. We comment on relation of the discussed quantum walks to integrable geometry of discrete curves. The talk is based on the preprint *A. Doliwa, A. Siemaszko, Spectral quantization of discrete random walks on half-line, and orthogonal polynomials on the unit circle*, arXiv:2306.12265.

Jannik Steinmeier (TU München) Tuesday 16:30

From 4D cross-ratio systems to constant curvature surfaces

Cross-ratio systems are known to be closely related to discrete surfaces of constant curvature. For example, one can find discrete pseudospherical surfaces (K-nets) in the associated family of special cross-ratio systems. Also, using the discrete DPW-method one can construct discrete CMC surfaces from a cross-ratio system which is interpreted as a discrete holomorphic map. We present reductions of the cross-ratio system which have such discrete surfaces in their associated families. The DPW method then corresponds to taking a slice in a 4D cross-ratio system. Other 4D cross-ratio systems allow for the construction of lattices of breather transformations of pseudospherical surfaces.

Wednesday

Cédric Boutillier (Sorbonne Université) Wednesday 10:00

Integrable Laplacians on isoradial graphs beyond the rational case

The dimer spectral theorem by Kenyon and Okounkov gives a bijection between weights on dimers for periodic planar bipartite graphs modulo elementary transformations and Harnack

curves with a standard divisor. Fock constructed an explicit inverse (from a curve to dimer weights) by constructing a (periodic) Kasteleyn matrix using Riemann theta functions of that curve.
George proved later a similar spectral theorem for periodic planar electric networks, which involved constructing a (periodic) Laplace operator, whose coefficients (the conductances) are expressed in terms of Prym theta functions.
The formulas for conductances and the Kasteleyn matrix make sense more generally for infinite "isoradial" graphs. In that general setup, we prove a relation between the Laplace operator and the Kasteleyn matrix, yielding connections between elementary transformations on graphs for both dimers and electric networks and some identities on theta functions. In the periodic case, this creates a bridge between the two spectral theorems discussed above.
We give also an explicit, local expression for the associated Green function, generalizing the work of Kenyon on isoradial graphs with trigonometric weights.
This is a joint work with David Cimasoni (Geneva) and Béatrice de Tilière (Paris Dauphine).

Wai Yeung Lam (U Luxembourg) Wednesday 11:00

Discrete hyperbolic Laplacian.

The Laplace operator on a Riemannian manifold is a fundamental tool to study the geometry of the manifold. Inspired by electric networks, Laplacians on graphs are defined with edge weights playing the role of conductance. When the edge weights are constant, the graph Laplacian becomes the combinatorial Laplacian and is known to reveal rich combinatorial information of the graph. Given a graph embedded on a surface, it is natural to consider a geometric Laplacian, where edge weights are adapted to the geometry. For the 1-skeleton graph of a geodesic triangulation on a Euclidean surface, there is a "cotangent formula" relating the edge weights to the Euclidean metric. It is known to connect with various problems, e.g. deformations of circle patterns, Delaunay decomposition and discrete harmonic maps. In the talk, we introduce the analogue for hyperbolic surfaces. This is joint work with Ivan Izmestiev.

Thursday

Roman Prosanov (U Wien) Thursday 10:00

Polyhedral surfaces in homogeneous 3-manifolds

Let M be a compact hyperbolic 3-manifold with non-empty convex polyhedral boundary. Then under mild additional assumptions it is uniquely determined by the intrinsic geometry of the boundary. I will discuss this result and some related problems for Lorentzian 3-manifolds of constant curvature. The talk is partially based on a joint work with François Fillastre.

Katrin Leschke (University of Leicester) Thursday 11:00

Discrete isothermic tori.

In this talk, we consider discrete isothermic surfaces via a gauge theoretic approach and discuss a construction of discrete isothermic tori via Darboux transformations. Viewing a discrete isothermic surface as successive Darboux transformations of discrete polarised curves we can reduce the closing conditions of its transforms to the monodromy problem on polarised curves. We illustrate this approach by providing closed-form discrete circular cylinder, discrete CMC bubbletons and discrete Bernstein tori. Explicit formulae allow to show that under the appropriate continuum limit, closure is preserved, and we obtain smooth isothermic tori in the limit. This is joint work with Joseph Cho and Yuta Ogata.

Yuta Ogata (Kyoto Sangyo University) Thursday 11:30

Periodic discrete Darboux transforms for curves.

We introduce the Darboux transformations for smooth and discrete curves via the quaternionic formalization. This leads to the linearization of Riccati type equations and we study their monodromy problem. We will show some examples of periodic (closed) Darboux transformations for curves. This is based on the joint work with Joseph Cho and Katrin Leschke.

Mason Pember (FSU London) Thursday 14:00

Spherical curvature lines.

In this talk we'll study surfaces with one family of spherical curvature lines using conformal geometry. We'll see that these surfaces are obtained via lifted folding of orthogonal maps in the plane satisfying the "Rouquet condition".

Isothermic surfaces with spherical curvature lines are then obtained via lifted folding of holomorphic maps satisfying the Rouquet condition. Such holomorphic maps are characterised as the isospectral deformations of constrained elastic curves and can be explicitly constructed in terms of Weierstrass functions. The symmetries of the Weierstrass functions are reflected in unexpected symmetries of the isothermic surfaces.

This is a work in progress with Francis Burstall, Joseph Cho and Gudrun Szewieczek.

Alexander Fairley (TU Berlin) Thursday 14:30

Koenigs nets and autoconjugate curves

Kœnigs nets are parametrised surfaces that are also known as conjugate nets with equal Laplace invariants. We focus on discrete Kœnigs nets in $\mathbb{R}\mathrm{P}^{2d}$ ($d \geq 1$) such that each parameter line is contained in a d-dimensional projective subspace. We explain a correspondence to pairs of autoconjugate curves of quadrics.

Jaume Alonso (TU Berlin) Thursday 16:00

Pencils of quadrics and a generalisation of QRT to 3D

In this talk, we introduce a framework that generalises QRT maps and QRT roots to 3 dimensions. We do so by using two pencils of quadrics and defining the maps as compositions of involutions along the straight-line generators of the quadrics. This is a natural way to construct integrable birational maps, which under certain geometric conditions become of degree 3. We show that the Kahan-Hirota-Kimura discretisations of the Euler top and the Zhukovski-Volterra gyrostat with one β are of this kind. We also use this result to solve the problem of integrable discretisation of the Zhukovski-Volterra gyrostat with two β's. This is a joint work with Yuri Suris and Kangning Wei.

Yuri Suris (TU Berlin) Thursday 16:30

Discrete Painlevé equations and pencils of quadrics in P^3

Discrete Painlevé equations constitute a famous class of integrable non-autonomous second order difference equations. A classification scheme proposed by Sakai interprets a discrete Painlevé equation as a birational map between generalized Halphen surfaces (surfaces obtained from $\mathrm{P}^1 \times \mathrm{P}^1$ by blowing up at eight points). We propose a novel geometric interpretation of discrete Painlevé equations, where the family of generalized Halphen surfaces is replaced by a pencil of quadrics in P^3. In our scheme, discrete Painlevé equations are viewed as deformations of 3D QRT maps, defined geometrically as a composition of involutions along generators of quadrics of a pencil, preserving the intersection curves with a second pencil of quadrics. The base set of the net of quadrics spanned by both pencils consists of eight points (which play the role of the eight blow-up points of generalized Halphen surfaces). A Painlevé deformation of a 3D QRT map is obtained by composing involutions along generators with a transformation of P^3 under which the pencil remains invariant, but the individual quadrics are mapped according to a certain transformation of the pencil parameter (dictated by the geometry of the base set of the pencil). Based on a joint work with J. Alonso and Kangning Wei.

Friday

Jean-Marc Schlenker (U Luxembourg) Friday 10:00

The pleating lamination of convex co-compact hyperbolic manifolds

A complete hyperbolic manifold is convex co-compact if it contains a non-empty, compact, geodesically convex subset. It then contains a smallest non-empty geodesically convex subset, its convex core, whose boundary is pleated along a measured geodesic lamination. Thurston conjectured that this measured pleating lamination uniquely determines the manifold. After explaining the main definitions, we will outline the proof of this statement. Joint work with Bruno Dular.

Alexey Balitskiy (U Luxembourg) Friday 11:00

How packing triangles helps to study symplectic isoperimetry

Claude Viterbo conjectured a symplectic isosystolic inequality, which has elementary implications in billiard dynamics and convexity. An important special case can be formulated in terms of packing a few simplices in a convex body of smallest volume. I'm going to talk about a few instances of this packing problem, including a counterexample of Pazit Haim-Kislev and Yaron Ostrover.

Sadashige Ishida (IST Austria) Friday 11:30

More symplectic structures on the space of space curves.

A symplectic structure on a space is a sandbox of Hamiltonian dynamics, meaning that it can create fun movements from an arbitrarily given function. The shape space of space curves is known to have a canonical symplectic structure so we can talk about Hamiltonian dynamics of space curves. But so far, no other symplectic structures have been found on this space. In this talk, I introduce "more" symplectic structures that generalize the classical one so that we can have more fun movements of space curves. Finally I hope to show some computer animation of the Hamiltonian dynamics generated by these new structures. Based on joint work with Martin Bauer and Peter Michor.

Anthony Ramos Cisneros (KAUST) Friday 14:00

Approximation by Meshes with Spherical Faces

Meshes with spherical faces and circular edges are an attractive alternative to polyhedral meshes for applications in architecture and design. Approximation of a given surface by such a mesh needs to consider the visual appearance, approximation quality, the position and orientation of circular intersections of neighboring faces and the existence of a torsion free support structure that is formed by the planes of circular edges. The latter requirement implies that the mesh simultaneously defines a second mesh whose faces lie on the same spheres as the faces of the first mesh. It is a discretization of the two envelopes of a sphere congruence, i.e., a two-parameter family of spheres. We relate such sphere congruences to torsal parameterizations of associated line congruences. Turning practical requirements into properties of such a line congruence, we optimize line and sphere congruence as a basis for computing a mesh with spherical triangular or quadrilateral faces that approximates a given reference surface.

Amir Vaxman (University of Edinburgh) Friday 14:30

Möbius Maps: challenges in interpolating discrete conformal maps

[Müller et al. 2015] presented piecewise-Möbius maps as an alternative for piecewise affine maps of polygonal meshes to interface notions in discrete conformal geometry such as the discrete Willmore energy or discrete conformal maps. However, these were vertex-based maps that did not consider interpolants. In this talk, I will explore new (and future) attempts to define piecewise Möbius maps continuously in triangle and general polygonal meshes, and the challenges in doing so.

Excursion and Dinner

Excursion

Option 1: Walk from Neuwaldegg to Dinner (Buschenschank Fuhrgassl-Huber)

Meeting point in front of Freihaus main entrance **at 2:30pm**

Public transport to starting point of excursion:
U4 Karlsplatz (direction Hütteldorf) → Längenfeldgasse
U6 Längenfeldgasse (direction Floridsdorf) → Alser Straße
Tram 43 (direction Neuwaldegg) → Neuwaldegg

Walk to Dinner (see map on the right)

Option 2: Public transport directly to dinner

Public transport to dinner (*without excursion*):
U4 Karlsplatz (direction Heiligenstadt) → Spittelau
Bus 35A (direction Salmannsdorf) → Neustift am Walde

Dinner at 5pm

Buschenschank Fuhrgassl-Huber
Neustift am Walde 68, 1190 Wien
www.fuhrgassl-huber.at

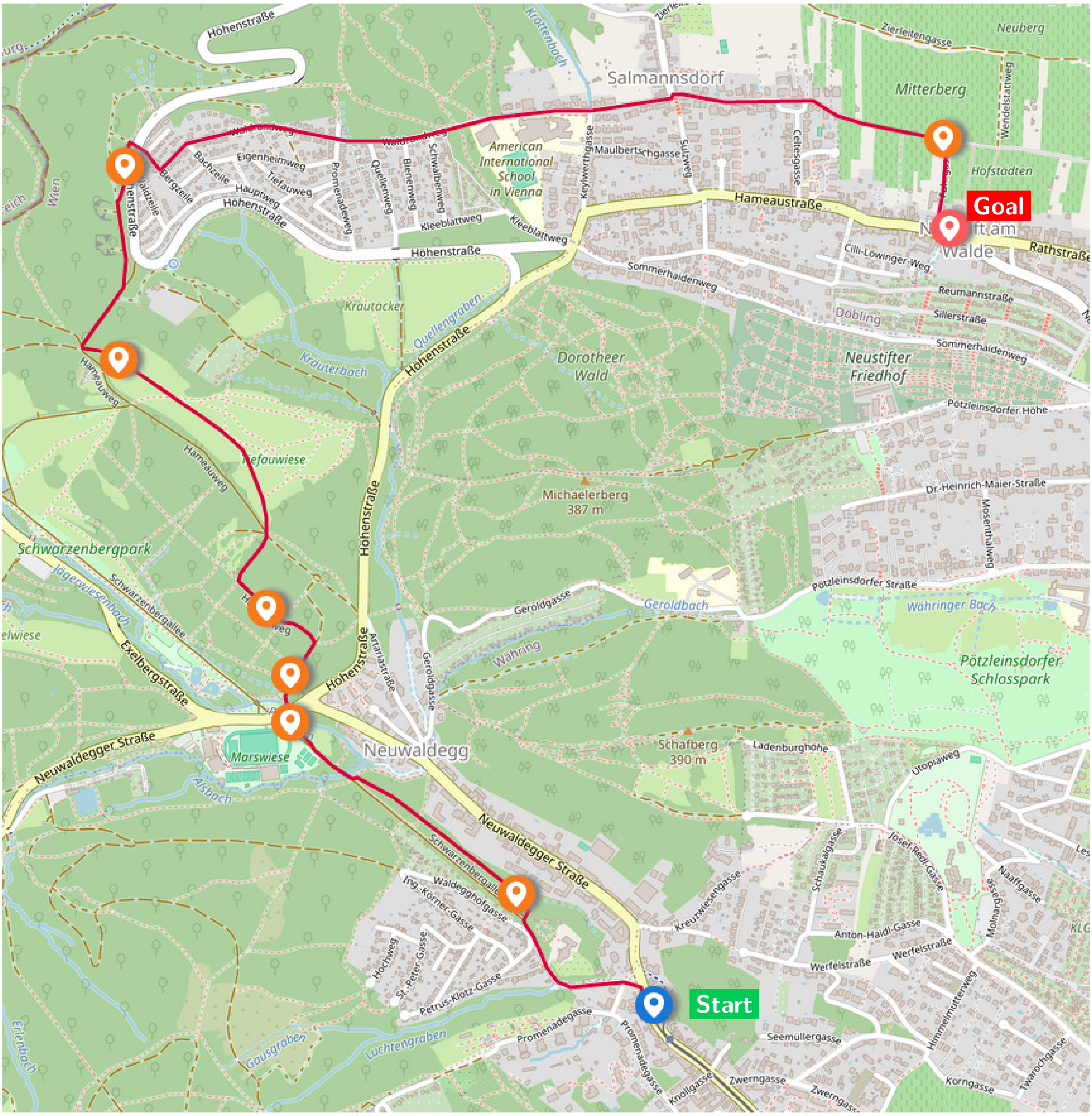
Public transport back to Karlsplatz:
Bus 35A (direction Spittelau) → Spittelau
U4 Spittelau (direction Hütteldorf) → Karlsplatz

Walk from Neuwaldegg to Dinner (Buschenschank Fuhrgassl-Huber)

Important Information

Distance: ≈ 5.6km   Time: ≈ 90 min

Ascend: ≈ 140m   Descend: ≈ 120m



Lunch and Dinner Recommendations

Lunch recommendations close to the university:

1 **Swing Kitchen (Vegan)**
Operngasse 24, 1040 Wien
www.swingkitchen.com

2 **BÁNH MÌ VIENNA (Vietnamese)**
Faulmanngasse 1, 1040 Wien
www.banh-mi4.eatbu.com

3 **SHU Restaurant Vienna (Sichuan)**
Operngasse 28, 1040 Wien

4 **Kebab-Haus (Turkish)**
Operngasse 26, 1040 Wien

5 **El Burro (Mexican)**
Margaretenstraße 9, 1040 Wien
www.elburro.at

6 **Kojiro 2 (Japanese)**
Kühnplatz 4, 1040 Wien

7 **Yong Streetfood (Asian)**
Rechte Wienzeile 9A, 1040 Wien
www.yongstreetfood.at

8 **Al Bacio (Pizzeria)**
Naschmarkt 975, 1060 Wien
albacio.at

9 **Tofu und Chili (Chinese)**
Linke Wienzeile 18, 1060 Wien

10 **Papas am Naschmarkt (Greek)**
Naschmarkt 509, 1060 Wien

11 **Bep Viet (Vietnamese)**
Favoritenstraße 2, 1040 Wien
www.bep-viet.at

12 **Pizzeria RIVA Favorita (Pizzeria)**
Favoritenstraße 4/6, 1040 Wien
www.riva.pizza

13 **Santos Wieden (Mexican)**
Favoritenstraße 4-6/2, 1040 Wien
www.santos-bar.com

14 **BOK Restaurant (Pan-Asian)**
Favoritenstraße 8, 1040 Wien
www.bok.co.at

15 **Wieden Bräu (Austrian)**
Waaggasse 5, 1040 Wien

16 **Chang (Asian)**
Waaggasse 1, 1040 Wien
www.chang.at

17 **Bánh Mì Hôi An (Vietnamese)**
Wiedner Hauptstraße 31, 1040 Wien
banmihoian.at

18 **Gorilla Kitchen (Burritos)**
Gußhausstraße 19, 1040 Wien
www.gorillakitchen.at

19 **Kenny's Karlsplatz (Bowls)**
Paniglgasse 15, 1040 Wien
www.kennys.at

20 **SALON WICHT!G (Curry)**
Karlsgasse 22, 1040 Wien
salonwichtig.at

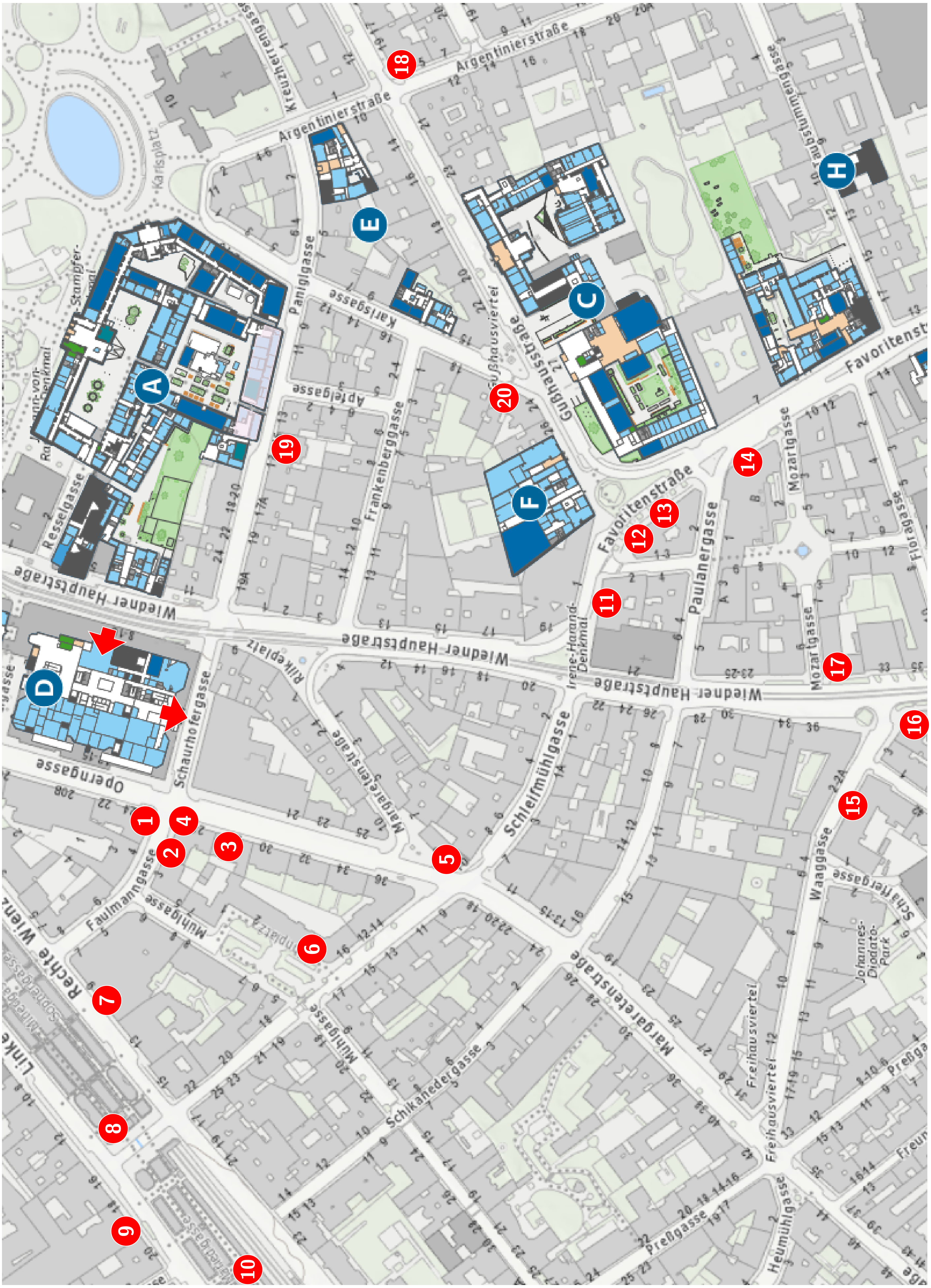
Dinner recommendations (reservations may be necessary):

Waldviertlerhof (Austrian)
Schönbrunner Str. 20, 1050 Wien
waldviertlerhof.at

Vietthao (Vietnamese)
Friedrichstraße 2, 1010 Wien

Zum alten Fassl (Austrian)
Ziegelofengasse 37, 1050 Wien
zum-alten-fassl.at

die freunderlwirtschaft (vegetarian)
Grünentorgasse 21, 1090 Wien
freunderlwirtschaft.at


Argentinierstraße
Kreuzherrengasse
Karlsplatz
Paniglgasse
Karlsgasse
Apfelgasse
Frankenberggasse
Gußhausstraße
Gußhausviertel
Favoritenstraße
Mozartgasse
Floragasse
Paulanergasse
Wiedner Hauptstraße
Resselgasse
Schaurhofergasse
Operngasse
Rilkeplatz
Margaretenstraße
Schleifmühlgasse
Faulmanngasse
Mühlgasse
Rechte Wienzeile
Linke Wienzeile
Schikanedergasse
Preßgasse
Heumühlgasse
Freihausviertel
Waaggasse
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