Knots and primes

Jannes Bantje:
Introduction to Knots and Primes

Jonas Stelzig:
Galois Groups and Fundamental Groups

It will be illustrated that Galois groups and fundamental groups behave similarly and the étale fundamental group for schemes will be defined. Then examples relevant for later talks are computed.

Wille Liu:
Cohomological Dimension of Number Rings

Martin Lüdtke:
Milnor Invariants and Multiple Residue Symbols

Jonas Stelzig:
Alexander Polynomial and Iwasawa Theory

A quick and dirty introduction to Iwasawa theory on the one hand side and the alexander polynomial on the other. The ultimate goal would be to say something meaningful on the iwasawa main conjecture and on the Cheeger-Müller theorem. It is not yet clear how far we can get in one talk, but there are many interesting things waiting to be discoverd along the way.

Matthias Kemper:
A Knot Theoretic Analogue of Chebotarev's Density Theorem

Other Analogies

Markus Schmetkamp:
The Topology of Communication and Cooperation with Applications to Math Riddles

The talk is about distributed computing and intrinsic difficulties of certain coordination taks that can be described via algebraic topology.

Sabrina Gemsa:
Non-Commutative Topology and C-Algebras*

Kevin Poljsak:
Algebraic and Topological K-Theory and Serre's Conjecture

In the first part of the talk we will see that the structure of vector bundles over compact spaces only depends on their homotopy type. On this basis it seems natural to construct a cohomologytheory, so called K-Theory.
In the second part we will show that every vector bundle over a compact space is projective. From that point of view we will compare these with projective modules over a specific ring and prove that both categories have much in common, i.e. there is an equivalence of categories. We'll easily get a connection between Topological and Algebraic K-Theory.

Guillaume Corlouer:
Exactly Solvable Models from Statistical Physics, the Yang-Baxter Equation, Quantum Groups, and Knot Theory

Andrea Drago:
Systolic inequalities

Gromov showed that in every torus T^n there exists a noncontractible curve; the lenght of which can be estimated by the n-th root of the volume. There exist now several proofs, that use different areas of geometry as a „metaphor“.

Gabriel Pallier:
Star polyhedra and Riemann surfaces

After recognizing the small stellated dodecahedron as a regular polyhedron among others, Poinsot made in 1809 the puzzling observation that (using modern language) it had the same Euler characteristic as a genus 4 surface. This analogy was made into a comprehensive statement by Klein in 1877, considering branched covering of the Riemann sphere, and then by Threfalls in the 1930s within the framework of hyperbolic geometry. We shall explain in this talk how one can associate a compact hyperbolic Riemann surface to any star polyhedron, and compare the Galois group of the associated algebraic curve to the automorphism group of the branched covering on the special case of the small stellated dodecahedron. Finally, we will briefly describe the 4-dimensional star polytopes and their relations to the 3-sphere using the icosian group.

Matthias Kemper:
Uniformisation in Complex Analysis and Metric Geometry

Robin Sroka:
Discrete Morse Theory