

**PostDoc position at the Faculty of mathematics and physics,
University of Ljubljana**

Research topic: Commuting matrices and Hilbert schemes

Area: Algebra and algebraic geometry

Description: Hilbert schemes are a powerful tool (introduced by Grothendieck) that parameterize various geometric objects. This project will study Hilbert schemes that parameterize collections of points in affine spaces, or equivalently, quotients of polynomial rings in several variables that have prescribed vector space dimension over the underlying field. It is well known that these Hilbert schemes can be described as quotients (in the sense of geometric invariant theory) of varieties of commuting matrices. Hilbert schemes and varieties of commuting matrices are well understood only in few special cases. The candidate will investigate the irreducible components, Krull dimensions, tangent spaces and radical ideals of these varieties. Many of these problems can be tackled with tools of linear algebra. The questions on commuting matrices can also be generalized to other Lie algebras. Among other, results may also be applied to representation theory or tensors.

The research is financed by Slovenian Research Agency through the research project Commuting matrices and Hilbert schemes of points. Travel costs for attending appropriate conferences and workshops will also be provided from this project.

Starting date: 1st October 2019.

Duration: 2 years.

Requirements: Candidate should have good publication record and PhD degree in one of the following areas: commutative algebra, algebraic geometry, Lie algebras, algebraic or Lie groups, representation theory.

Application: The applicants should submit their CV with the list of publications, letter of interest, a copy of PhD thesis and one recommendation letter. The applications should be sent to the e-mail address klemen.sivic@fmf.uni-lj.si.

Deadline: 31st May 2019.

Contact: Klemen Šivic, klemen.sivic@fmf.uni-lj.si.