

## **Ben Webster**

### *Gelfand-Tsetlin theory and Coulomb branches*

The algebra  $U(\mathfrak{gl}_n)$  contains a famous and beautiful commutative subalgebra, called the Gelfand-Tsetlin subalgebra. One problem which has attracted great attention over the recent decades is to classify the simple modules on which this subalgebra acts locally finitely (the Gelfand-Tsetlin modules). In investigating this question, Futorny and Ovsiienko expanded attention to a generalization of these algebras, saddled with the unfortunate name of “principal Galois orders”. I’ll explain how all interesting known examples of these (and some unknown ones, such as the rational Cherednik algebras of  $G(l,p,n)$ !) are the Coulomb branches of  $N = 4$  3D gauge theories, and how this perspective allows us to classify the simple Gelfand-Tsetlin modules for  $U(\mathfrak{gl}_n)$  and Cherednik algebras and explain the Koszul duality between Higgs and Coulomb categories  $\mathcal{O}$ .