Harvard College/Graduate School of Arts and Sciences: 220545
Term: 2022 Fall / Full Term
Course Instructor(s): Peter Kronheimer
Meeting Time: Monday 12:00 PM - 01:15 PM; Wednesday 12:00 PM - 01:15 PM
Location: SC 221

This course will survey some examples and questions in low-dimensional topology, focusing on those questions where progress has been made using tools such as knot homology, Khovanov homology, and instanton Floer homology. I hope that the topics we cover will form an interesting random walk in the field.

This course is not intended as an introduction to anything in particular ("knots" or "3-manifolds"), but may touch on concepts that have seen an important supporting role in the past twenty years or so (Legendrian knots, contact structures), as well as questions that have interested me particularly (such as embedded surfaces in 4-manifolds). At some point, we will introduce tools from gauge theory, but only in outline, as time permits.

Prerequisites
The course is mostly intended for graduate students interested in learning a little more about the field. When needed, I will draw on basic concepts from algebraic geometry and smooth manifolds, such as vector bundles and characteristic classes.

Assignments
I will set occasional homework assignments. These will mostly be there to encourage you to explore further and think about the material in different ways. In particular, they will (mostly) not be about reinforcing the learning from class, nor will they be well designed for course evaluation. If you are enrolled in the course for a letter grade (or if that is a possibility, depending on the quals), then let me know. Meaningful engagement with the assignments will be the basis for grading.

Contact me
Please reach out to me by email (e.g. through Canvas or directly). I will also have regular office hours and would love to meet you.