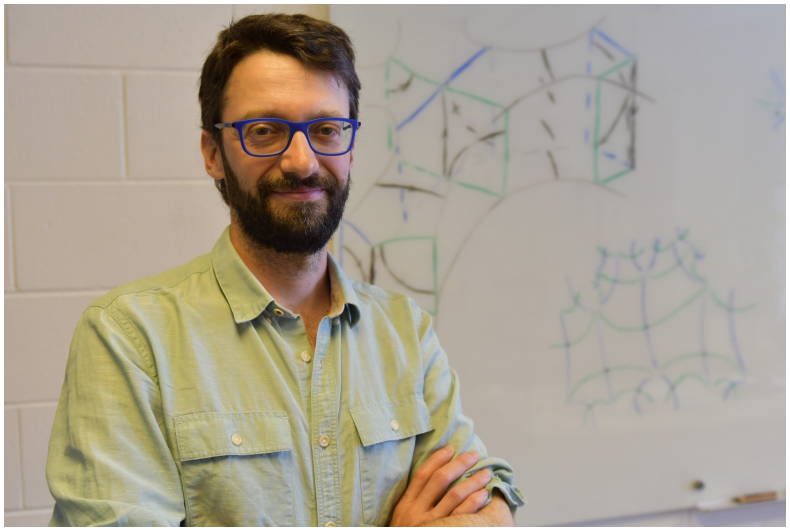

My name is Thomas Barthelmé and I am an Associate Professor in the Department of Mathematics and Statistics at Queen's University.

My research interests lie in between geometric topology and dynamical systems, with a focus on problems mixing these domains. In particular, I like to try to understand how the dynamics of a system influence the topology of the underlying space and vice versa. Here are some of the questions I am currently interested in.

Problem 1 *Writing an algorithm that produces a list of 3-manifolds supporting Anosov flows.* Anosov flows are a fundamental and central class of examples in smooth dynamical systems, but we still don't know much about which 3-manifolds can support them. Recent advances in the field opens the possibility of exploring algorithmically these manifolds.

Problem 2 *Symmetries of (pseudo)-Anosov flows and partially hyperbolic diffeomorphisms.* Conjecturally all partially hyperbolic diffeomorphisms in dimension 3 are related (semi-conjugated) to some symmetries of Anosov flows. This naturally leads to do questions: can one describe all the symmetries of a (pseudo)-Anosov flow, and, given such a symmetry, can one build a related partially hyperbolic diffeomorphism?

Problem 3 *Centralizers of partially hyperbolic diffeomorphisms.* A classical question in dynamics is to understand the centralizer of a system, i.e., all the diffeomorphisms that commute with a given dynamical system. In the case of certain partially hyperbolic diffeomorphisms, Damjanovic, Wilkinson, and Xu proved a beautiful dichotomy: The centralizer is either (virtually) trivial, or (virtually) isomorphic to $\mathbb{Z}$, in which case the diffeomorphism is very specific. The goal of this problem is to generalize this result to a much wider class of partially hyperbolic diffeomorphisms in dimension 3.

If you find any of these problems interesting or would like to hear more about my research, do not hesitate to contact me at thomas.barthelme@queensu.ca