Research Statement

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My research interests lie in inner model theory and coding techniques such as Jensen's coding theorem [1]. More specifically, I am interested in how the methods of those fields can be combined successfully in different applications.

An example is the following theorem by J. Steel, which provides a negative answer to the 12th Delfino problem [2]. The 12th Delfino problem asks whether the following statement holds true:

$$(ZFC + \triangle) \vdash PD$$

where
$\triangle=$"every projective set is Lebesque measurable, has the Baire property and can be projectively uniformized".

Steel showed that the consistency strength of $\triangle$ is strictly less than a $Woodin$ cardinal thus the above implication totally fails. A crutial part of the proof is the association of trees representing universal $\mathbf{\Pi^1_n}$ sets with certain premice. Those premice become countable after the final collapsing forcing and they are used to derive a projectively definable uniformization function.

One can try to refine Steel's result by asking, for example, whether projective uniformization can be strengthened to "every $\mathbf{\Pi^1_{2n+1}}$ set admits a $\mathbf{\Pi^1_{2n+1}}$ uniformization". Trying to answer questions of this kind seems to be similar to attempting to push down the complexity of the generic used to code a given set into a core model [3].

At the moment I am working on the problem of coding into a core model using set forcing.

References

[1] A. Beller, R. Jensen, P. Welch [82], **Coding the universe**, London Mathematical Society Lecture Note Series, vol. 47, Cambridge University Press, Cambridge.

[2] P. Doebler [06], **The 12th Delfino Problem and universally Baire sets of reals**, Master Thesis, University of Muenster, Muenster.

[3] R.-D. Schindler [01], **Coding into K by reasonable forcing**, Transactions of the American Mathematical Society 353, no. 2, 479-489.