



Christopher Davis

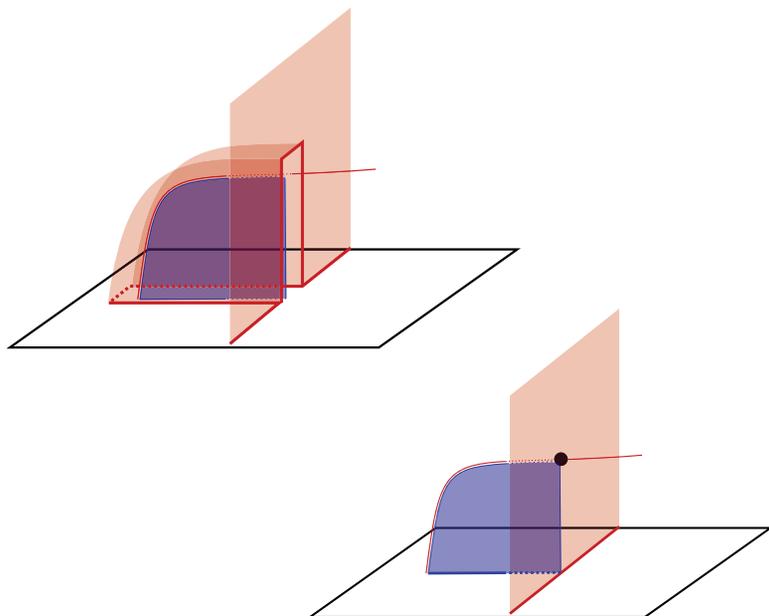
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Sabbatical Research:

The Behavior of Knot Concordance in More Complicated Spaces

This project centers on the study of knot concordance. Informally this asks which 3-dimensional knots become trivial in 4-dimensional space. A particular emphasis of my study is knots in spaces which are algebraically similar to the classical 3-space, called homology spheres. It is not hard to show that any knot in 3-dimensional space can be unknotted by a sequence of crossing changes - if you can pass the strands of a knot through each other, you can undo any knot. The same is not true for knots in homology spheres. I proved, however, that it is true up to concordance. Any knot in any homology sphere can be reduced by a sequence of crossing changes to be trivial in knot concordance.

During the course of this sabbatical, I completed three research projects resulting in papers submitted for publication and had appear in publication five articles, all in peer reviewed professional Mathematics journals. A book entitled "The disc embedding theorem" on which I am a contributing author has been published by the Oxford University Press. One project started during the sabbatical remains in progress.



List of Publications:

- *On the indeterminacy of Milnor's triple linking number.* Joint with Jonah Amundsen and Eric Anderson. Journal of Knot Theory and its Ramifications. Vol. 29, No. 09, 2050064 (August 2020). DOI:<https://doi.org/10.1142/S0218216520500649>
- *The C-complex clasp number of links* Joint with Jonah Amundsen, Eric Anderson, and Daniel Guyer. Rocky Mountain J. Math., Volume 50, Number 3 (December 2020), 839-850. DOI: 10.1216/rmj.2020.50.839
- *Triple linking numbers and surface systems.* Joint with Matthias Nagel, Patrick Orson, and Mark Powell. Indiana University Journal of Mathematics. (December 2020). DOI: 10.1512/iumj.2020.69.8081
- *Linear independence of cables in the knot concordance group.* Joint with JungHwan Park and Arunima Ray. Transactions of the American Mathematical Society (February 2021) \DOI: <https://doi.org/10.1090/tran/8336>
- *Moves relating C-complexes: A correction to Cimasoni's "A geometric construction of the Conway potential function."* Joint with Taylor Martin and Carolyn Otto. Journal of Topology and its Applications. (October 2021) \DOI: <https://doi.org/10.1016/j.topol.2021.107799>
- *The Disc Embedding Theorem*, Edited by Stefan Behrens, Boldizsar Kalmar, Min Hoon Kim, Mark Powell, and Arunima Ray. Oxford University Press. ISBN: 9780198841319