

Math Awareness Month Colloquium

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102 Gore Hall

Machine Self-Reference And The Theater Of Consciousness

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On the one hand:

In the 1930s Kleene published his Strong Recursion Theorem which provides for program/machine self-reference *over and above* that needed to capture the special case of programming language recursive calls or even Brian Smith's lisp programs which examine their own traces. This result has had many applications in the theory of computability.

I will explain pictorially, symbolically, and conceptually Kleene's result as well as provide illustrative, brief, elegant, mathematical applications.

On the other hand:

Human consciousness is a conceptually difficult, multi-faceted phenomenon, with disparate facets including, awareness, qualia, *and* self-reflection/self-modeling.

The main focus of my talk will feature, then, a pictorial *modification* of Kleene's result, which modification, I'll argue in detail, can insightfully model an idealized version of the self-reflecting/self-modeling facet of human consciousness. There will be some corresponding recommendations to the neurophysiologist regarding a possible, *corresponding* decomposition of brain functions to look for.

I'll close with some hints as to what *use* this self-reflecting/self-modeling aspect of consciousness may have.