

# Many Cheerful Facts

Organizer: Jeffrey Galkowski, Alex Kruckman  
Wednesday, 3:00pm-4:00pm, 891 Evans

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November 30.

Speaker: Noah Schweber, UC Berkeley

Title: *Degrees of Incomputability*

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Abstract: In the early twentieth century, logicians tried to formalize the intuitive notion of a set or function being algorithmically computable. Eventually, Turing machines were settled upon as giving the "right" answer. With the notion of Turing machines, it became possible not only to ask whether a given set or function was computable, but even to ask whether one non-computable set was "strictly more non-computable" than another. This notion of relative computability yields a partially ordered set: the Turing degrees.

In this talk, we'll begin by defining the basic notions (including what a Turing machine is), and from there move on to show several properties of the lattice of Turing degrees and examining the proof strategies needed to verify them. One of the themes of the talk will be that, while many naturally-occurring partial orders have nice structural properties, the Turing degrees are terribly badly behaved.

No background in logic or computer science whatsoever will be assumed.

I am the very model of a modern Major-General,  
I've information vegetable, animal, and mineral,  
I know the kings of England, and I quote the flights historical  
From Marathon to Waterloo, in order categorical;  
I'm very well acquainted, too, with matters mathematical,  
I understand equations, both the simple and quadratical,  
About binomial theorem I'm teeming with a lot o' news,  
With many cheerful facts about the square of the hypotenuse.  
I'm very good at integral and differential calculus;  
I know the scientific names of beings animalculous:  
In short, in matters vegetable, animal, and mineral,  
I am the very model of a modern Major-General.