David Scheinker

Can studying infinite dimensional space help us improve healthcare?

Abstract:
Could a hotel with a guest in each room give a new guest her own room without asking anyone to leave or share rooms? Could a surgeon with a perfect scalpel cut a pea into 5 pieces and reassemble them into a sphere the size of the sun? Could the dough lying in a pizza pan be pushed out of the middle to form a ring of crust without being ripped? In our world, the answer to each of these questions is ``no." But, if you consider infinite sets and infinite dimensional spaces, each answer becomes ``yes." Furthermore, the theories built around these ideas have been used to design iPhones, predict the outcomes of presidential elections, and teach computers how to learn.

The first part of this talk will use visual illustrations to explain the seemingly impossible mathematical theories of the hotel, the pea, and the pizza. The second part of this talk will explain the role these theories played in the development of quantum mechanics, probability theory, and machine learning. The third part of this talk will focus on current research in machine learning and how it is being used to improve the flow of patients through a busy hospital.

Bio:
David Scheinker received a BA and MA in mathematics from The University of Pennsylvania in 2005, received a PhD in theoretical mathematics from The University of California San Diego in 2011, and has been a research fellow at MIT and MGH since September of 2013. His areas of research include functions of several complex variables, operator theory, computational learning theory, and healthcare management. Before his current position he conducted theoretical math research and taught at several universities, most recently as a visiting assistant professor at Drexel University.

Concurrently with his university appointments, David has sought out opportunities to communicate mathematics to a broader audience. He worked as a statistical consultant for The Center for Neurological study at UCSD, lectured in several high schools, and spent several summers teaching theoretical math to gifted 11 and 12 year old students for the Johns Hopkins Center for Talented Youth. He wrote a textbook titled "Math Problems and Solutions" and is currently working on a popular math book titled "Infinity in Wonderland."