

## RISE Talk

**Who?** [Iraj Saniee, Ph.D.](#), Head of Mathematics and Algorithms Research Group at Nokia Bell Labs, Murray Hill, NJ

**What?** An Overview of Mathematics Research at Bell Labs, 1915-55

**When?** 12:00-1:00 on Wednesday, March 27

**Where?** Hall of Sciences, Room 326

In preparation for the Shannon Centennial Celebration in April 2016 at Bell Labs, and also to help create the [Shannon Web Exhibit](#), I spent (more than) a fair amount of after-hours time at the Bell Labs Archives searching and sorting through original documents related to Claude Shannon. In the process, I came across a collection of information about the Math Dept (later Math Center) at Bell Labs which I found enlightening. Why would an industrial R&D organization hire mathematician in the early 20<sup>th</sup> century? What was the research focus of mathematicians at Bell Labs in 1910s, 20s, 30s, 40s, and 50s? What kind of people were hired? Why were more women in the math team for over two decades until the 1950s? What kind of results were obtained? Did math research help advance the ambitions of the parent company American Telephone & Telegraph Company? Looking back 10, 20, 30, 40, 50 years, was this investment worthwhile? I hope to narrate a few historical threads that address these questions. I will also extrapolate from these observations to suggest a plausible model of industrial (math) research for 21<sup>st</sup> century, at a time that the term ‘industrial research’ appears to be losing its significance.

**Bio:** Iraj Saniee is head of Mathematics and Algorithms Research at Bell Labs, Nokia in Murray Hill, NJ. The three departments in his group work on research in math of communication (Murray Hill, NJ), math of networks (Villarsceaux, Paris) and math of systems (MH, NJ and Cambridge UK). Iraj has worked on optimization of networks and systems, done research in statistics of network traffic and geometry of networks, developed decentralized and self-organizing algorithms for network management and control, and more recently has done work on the theory of deep learning. He has been the recipient of AFOSR, NIST and DARPA grants on a variety of topics related to math of networks and systems and been a participant at many of the National Academy’s interdisciplinary NAKFI workshops. Over the past 3 decades he has been a member of INFORMS, IEEE, SIAM and AMS and has served on technical program and advisory committees and editorial boards of several conferences, journals and universities.