# Editor's Introduction

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It is my pleasure to introduce Issue 11.1 of SIGecom Exchanges. This issue features seven research letters on a broad spectrum of topics and a solution to the *Borrowing in the Limit as Our Nerdiness Goes to Infinity* puzzle of Issue 10.2. (And see below for a bounty on the most recent puzzle.)

In the first letter, Roth reviews recent progress at the boundary of mechanism design and differential privacy. Focusing on the sensitive surveyor's problem – a surveyor designs a mechanism to obtain an accurate estimate of some population statistic when agents in the population care about privacy – he discusses results on designing direct revelation mechanisms and take-it-or-leave-it mechanisms to achieve non-trivial accuracy.

The second letter is about rationing problems, a type of fair division problem. A standard rationing problem allocates a divisible resource to a set of agents, each demanding some amount of the resource with total demand exceeding the available resource. Moulin and Sethuraman revisit the theory of standard rationing problems, in particular the consistency requirement, in a bipartite setting where there are multiple substitutable resources, and each agent has a global demand for resources but has access to only a subset of them.

Roughgarden outlines in the third letter an exciting, recent theory for bounding the price of anarchy (PoA) in games of incomplete information. In his earlier work, focusing on games with complete information, Roughgarden develops an extension theorem, via the concept of smooth games, that automatically extends the PoA bounds of pure-strategy Nash equilibria to some more general equilibrium concepts including mixed-strategy Nash equilibria. The recent theory defines smooth games of incomplete information and establishes the PoA bounds of mixed-strategy Bayes-Nash equilibria by directly extending the PoA bounds of pure-strategy Nash equilibria in induced games of complete information.

In the next letter, Nikolova and Stier-Moses introduce uncertainty and risk-aversion into routing games. In a model of stochastic edge delay and risk-aversion players, they investigate equilibrium existence, characterization, and PoA in routing games and suggest open questions.

The fifth letter by Caragiannis et al. considers computing $\rho$-approximate Nash equilibria, where no unilateral deviation can improve a player's payoff by a factor larger than $\rho$. For weighted and unweighted congestion games with polynomial latency functions of constant maximum degree, Caragiannis et al. describe positive algorithmic results for computing $O(1)$-approximate pure-strategy Nash equilibria.

In the sixth letter, Haghpanah et al. discuss their work on approximating revenue-maximizing auctions in single parameter settings. The optimal Myerson auction requires solving an NP-hard optimization problem with virtual values of bidders. Instead of approximating the optimal solution of this problem point-wise (i.e., for

each realization of values) as in prior work, Haghpanah et al. approximate the optimal solution on average, with respect to the distribution of virtual values.

The last letter by Bagchi et al. presents the allocation and trading of carbon dioxide emission credits as mechanism design problems. The allocation of carbon credits to organizations and the subsequent buying and selling of carbon credits among organizations call for well designed mechanisms to achieve optimal emission reduction. Bagchi et al. describe some initial results on the allocation problem.

Our puzzle editor, Daniel Reeves, brings us Shorrer's solution to the *Borrowing in the Limit as Our Nerdiness Goes to Infinity* puzzle. Armed with the definition of the time-value of money – i.e., what precisely we mean by an interest rate – the most elegant solution involves a simple integral, summing up the stream of infinitesimal payments. Shorrer provides two variants of the solution and discusses potential practical implications.

As we haven't received a correct solution to the *Contingency Exigency* puzzle of Issue 10.3, there is no new puzzle in this issue. Believing in incentives, randomness, and general nerdery, our puzzle editor has put aside up to $500 as a bounty, to help ensure we get one. Here are the crazy details:

> The best – fastest and most elegant – solutions to *Contingency Exigency* will share a bounty. The bounty amount is a $U[0, 500]$ random variable. Of course you won't want to trust me to instantiate the random variable so we'll use xkcd's geohashing algorithm: http://xkcd.com/426/. The bounty amount is $500 times Greenwich's longitude value on the date of submission of the first correct solution. (Note that you could strategically delay your submission to, in expectation, increase the bounty, at risk of getting scooped.) As to how the bounty is shared between the fastest and most elegant, that's entirely to my discretion, but resubmissions are allowed, so you can aim to be both and make the question of sharing moot.

Finally, I would like to thank our Information Director, Felix Fischer, who as always has been very helpful in putting the issue together.