

Nobusumi Sagara (1967 - 2023): A Remembrance in Brief

Nobusumi Sagara, Professor of Economics at Hosei University, passed away in Tokyo on July 4, 2023. He was a student at Hitotsubashi University from 1990 to 1995, and then completed his Ph. D. dissertation in economics at the hands of Professor Akira Yamazaki in 2005 at the same University. His first scientific publication, the year of his professional birth, was in Japanese on “near-rationality,” and it is worthy of note that it dates to a decade well before he obtained his final degree. His first English publication, again a half-decade before the completion of his Ph. D. degree, was on “optimal growth with recursive utility: An existence result without convexity assumptions.” However if one limits oneself to the last two decades of his formal professional career, one is impressed with how much he achieved in such a short period of time as an independent scholar of a rather obvious depth and diversity.

I borrow the words of Wallace Stevens to say:

Even when the book lay turned in the dust of the table
It reminded him how he had needed a place to go to in his own direction,
How he had recomposed the pines,
Shifted the rocks and picked his way among clouds,
For the outlook that would be right,
Where he would be complete in an unexplained completion:

In a message to the author on November 17, 2019, Nobusumi expressed satisfaction at his collaboration with Farhad Husseinov on exchange economies with heterogeneous divisible commodities: a 2012 paper published on “concave measures and the core” in *Fuzzy Sets and Systems*, and a 2013 paper on “envy-free allocations” in *Social Choice and Welfare*. He talked of the considerations that went into the choice of outlets, but more importantly, noted that this work “used the Lyapunov theorem in finite dimensions, which was a good background for the Khan-Sagara project before I spent my sabbatical at Hopkins.”

He came to Johns Hopkins and to Baltimore in October 2011, first on a visit of reconnaissance, as recommended by me, and then to spend a continuity of eighteen months. It was for me a singularly happy and productive period. His last paper with me arising out of that visit was in *Communications in Economics and Mathematical Sciences* on “Fuzzy core equivalence in large economies: A role for the infinite-dimensional Lyapunov theorem.” Remaining with his message, I note that at the end of it, he expressed his wish, not to be fulfilled, to write another paper on optimal control with Husseinov, and concluded with a self-characterization that “I am sure that he is basically an optimal control theorist. Same with me.”

I am clear as I write this obituary of a scholar with whom I shared a life of letters from 2011 onwards that this was only one identity among many others. But how is one

to go beyond what and how a scholar sees himself – his identity in the world at large and within the communities that he lives and functions? How is one to go beyond self-images and self-characterizations? How is one to get an overview of a life devoted to a calling of scholarship? What words and concepts keep recurring and give purpose and signature to a life?

To be sure, Lyapunov was one such name. But there were others: Fatou, Pareto, Walras, Banach, Galerkin, Maharam, Asplund, Sobolev, Lovász, Aubin, Weber. And there were co-authorships and collaborations: in addition to Husseinov, and to myself, a list as impressive as any: Frankowska, Mordukhovich, Suzuki, Vlach, Zaslavski. As to topics of interest, surely optimal control theory in its non-convex non-smooth mode, but also vector measures and measure theory on the mathematical side; and problems of fair division and no-envy, Walrasian equilibrium theory and co-operative game theory on the social-sciences side. And he had interests in both Marx and Sraffa though he kept these largely to himself – regarded them as more personal than professional.

In the last years of his life, whereas he had returned to the calculus of variations, he saw as his special responsibility the promotion and furtherance of the understanding of *saturated measure spaces* for, and in, mathematical sciences. He would often wonder to the author what Japanese word he should use to translate the concept, a task for which his interlocutor was particularly unsuited. It is here that he found a concept that underlay and unified his interests – a concept that gave him and his calling its completion. He proved many an equivalent characterization of it in both mathematics and in economics.

He sent to the author on December 10, 2021 the following lines in two messages separated by an hour:

You are the first person whom I confessed that I became sick. As I expected confidently, the diagnosis is last stage cancer. I will have an anti-cancer therapy next week, but the effect for the treatment is likely to be zero or very limited. [And an hour later.] Let us forget about my disease and finalize our manuscript. Still, I can work with you and I am very happy with that.

And so it was. We worked till the end. His last message to me (there were others on which I was merely copied) is dated May 26, 2023. He discussed the title of a manuscript on which we were working together in an attempt to finalize what still remains to be finalized: one of several manuscripts that he left to me and which still languish. But it is not these manuscripts alone that he bequeathed to me: he taught me in his short career what co-authorship means: how a scholar is to live and how he is to die. I draw on his example, I mourn him, and I treasure his memory.

M. Ali Khan
December 22, 2024