

Transmitter Localization in Vessel-like Molecular Channels

by

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All interested are cordially invited.

ABSTRACT:

Molecular communication via diffusion in vessel-like environment targets critical applications such as detection of abnormal and unhealthy cells. In this work, we derive the analytical formulation of the channel model for diffusion dominated movement, considering ring-shaped (i.e., patch) observing receivers and Poiseuille flow with the aim of localization of the transmitter cell. Then, we derive formulations using this channel model for two different application scenarios. We assume that the emission start time is known in the first scenario, and unknown in the second one. We successfully localize the transmitter cell using a single receiver for the first scenario, whereas two receivers are used to localize the transmitter cell in the second scenario. Lastly, the devised analytical framework is validated with simulations.

BIOGRAPHY:

Dr. Mehmet Şükrü Kuran received his B.S. degree in Computer Engineering from Yildiz Technical University, Turkey in 2004, his M.S. degree in Systems and Control Engineering, and his Ph.D. degree in Computer Engineering from Bogazici University, Turkey in 2007 and 2012 respectively. Between 2013 and 2014 he worked as a Postdoctoral researcher in LINCS research center at Telecom ParisTech, France. In 2010 he worked as a visiting Ph.D. student in Polytechnic University of Catalonia (UPC), Spain. Between 2015 and 2018 he worked as an assistant professor in the Computer Engineering Department of Abdullah Gul University, Turkey. Currently he is working as a senior research engineer in the research department of AirTies Wireless Networks, Turkey. His research interests are Nanonetworking & Molecular Communications, Network Security, Wireless LANs (IEEE 802.11x), Wireless Mesh Networks, Computer-aided Game Design, Game AI development, and Information Centric Networking.