



## ***Big Data and the Changing Rhythms of Migration***

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Migration is often treated as a steady flow, yet the growing body of high-frequency data tells a different story: human mobility follows rhythms. People move in bursts and pauses, reroute in response to shocks, and navigate journeys that unfold in non-linear stages. These dynamics are largely invisible in traditional datasets, but they emerge clearly when we look across satellite observations, mobile-phone records, platform activity and administrative registers. In this talk, I introduce a multi-level temporal lens for understanding (complex) migration, one that connects micro-level digital signalling and short-term movements, meso-level pauses and multi-stage re-anchoring, and macro-level cycles tied to climate variability, labour demand and policy shifts. Seeing migration as a set of interacting rhythms opens new possibilities for analysis, while also revealing the clear limits of big data: it cannot capture motivations, exclusions, or the lived experience behind the signals. Understanding these changing rhythms offers a scientifically grounded and realistic way to use big data to illuminate complexity, without overclaiming prediction, and to build more responsive, context-aware systems for studying mobility in an increasingly uncertain world.

**Tuba Bircan** is a research professor of sociology at the Vrije Universiteit Brussel (VUB), where she directs the Brussels Institute for Social and Population Studies (BRISPO) and leads the AIMS Lab on AI, Migration and Society. An interdisciplinary computational social scientist, her research spans migration, social inequalities, and public policy, with a strong focus on integrating Big Data and AI into the study of socio-political challenges. She led the H2020 HumMingBird project on innovative migration measurement and currently co-leads the CLIMB project on climate-induced mobility, in addition to several national initiatives. A committed advocate of open and societally engaged science, she serves on the editorial boards of Nature Humanities and Social Sciences Communications, PLOS



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