Key Points from Day 4 (Friday, January 20)
[DRAFT]

I. **Data captured during the MAPPING@Brown exercise will likely include: absolute (person-to-place) and proximity data (person-to-person) collected via Bluetooth and self-reported data (e.g., demographics, health status). Geographic data collected via GPS and passive data (e.g., aggregate data on wifi hotspots across campus) could be captured during Phases II and III.**

    A. We must implement clear protocols ito enable individuals to leave the study at any time and possibly even to elect to withdraw their previously collected data. Retroactive withdrawal may introduce challenges if we anonymized devices such that they can't be followed over multiple days.

II. **This project concerns massive surveillance/large scale data collection and we need to clearly define a participant's locus of control surrounding their data. Privacy concerns will vary by student, faculty, staff status. During Phase I, only select MAPPS investigators will have access to the data.**

III. **Our (to-be-defined) analytic goal with this study and the statistics of interest (e.g., precise vs imprecise) will dictate the extent to which differential privacy is applied to our data. If our goal outweighs the risk of deconstruction attacks that could occur by not using DP, then we may not want to use DP at all. Alternatively, we could apply DP methods only to the statistics we plan to publish. There will already be naturally occurring "fuzzing" built into our data due to technological and human error.**

IV. **Future projects exploring DP applications could include (a) deriving or estimating sensitivity of simulator, (b) demonstrating clear, un-obfuscated data vs. epsilon-DP vs. no information for simulation, (c) simulating reconstruction attacks for graphed network data, and (d) noising data vs. noising output.**

    A. For MAPPING@Brown, we primarily care about modelling social ties, interactions, and environmental data. For future Phases, will we aim to model a pandemic in real-time or to use data for future pandemic planning/preparedness?

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V. **Using in persona simulation for at least Phase 1 of MAPPING@Brown can help privatize information to beacons and phones, which can then be used for graph-based and location-based simulations. We will need to identify which parts of the simulation algorithm can be protected by a certificate of confidentiality vs. through the use of multi-party computation (MPC) protocols.**

VI. **Other comments/considerations:**

    A. Be clear about what the Brown IRB will approve in terms of data sharing during each Phase.
    B. Consult a Community Advisory Board when planning for Phase 1 and Phase 2.
    C. Be cognizant of the costs of Phase I (e.g., $/beacon).
    D. Ensure our approach complies with all legal and regulatory requirements in the U.S.
    E. It may be much more efficient and effective to adapt an existing application for this study rather than to create a new smartphone app from scratch.

VII. **Outstanding questions and next steps for Phase I planning (panel discussion with MPIs)**

    A. Consult with health policy makers as to (a) what data they wish they had to manage and prepare for a pandemic outbreak, and (b) what their capacity is for managing and analyzing the real-time mobility data.
    B. What are the wider implications/potential uses of the App?
        1. Finding specific populations who are socially isolated, and engaging them in interventions
        2. Identify an emerging hot spot in real-time
        3. Biometric data (heart rate, blood sugar, temperature, sweat, mobility) could be useful in long-term care facilities / home health / nursing homes
        4. Queuing systems (e.g., in amusement parks)
    C. Manuscript ideas will be shared with MAPPS colleagues, and those with interest will be invited to serve as co-authors.