Image-Based Indoor Navigation for the Visually Impaired
## Marco F. Duarte (PI) and Aura Ganz (Co-PI)

Challenge:

- For individuals with visual impairment, independent navigation indoors is a challenge.

- Our baseline approach generates a vision-based spatial map, but often leads to multiple fractured maps that must be stitched by hand and are incomplete at breakpoints.

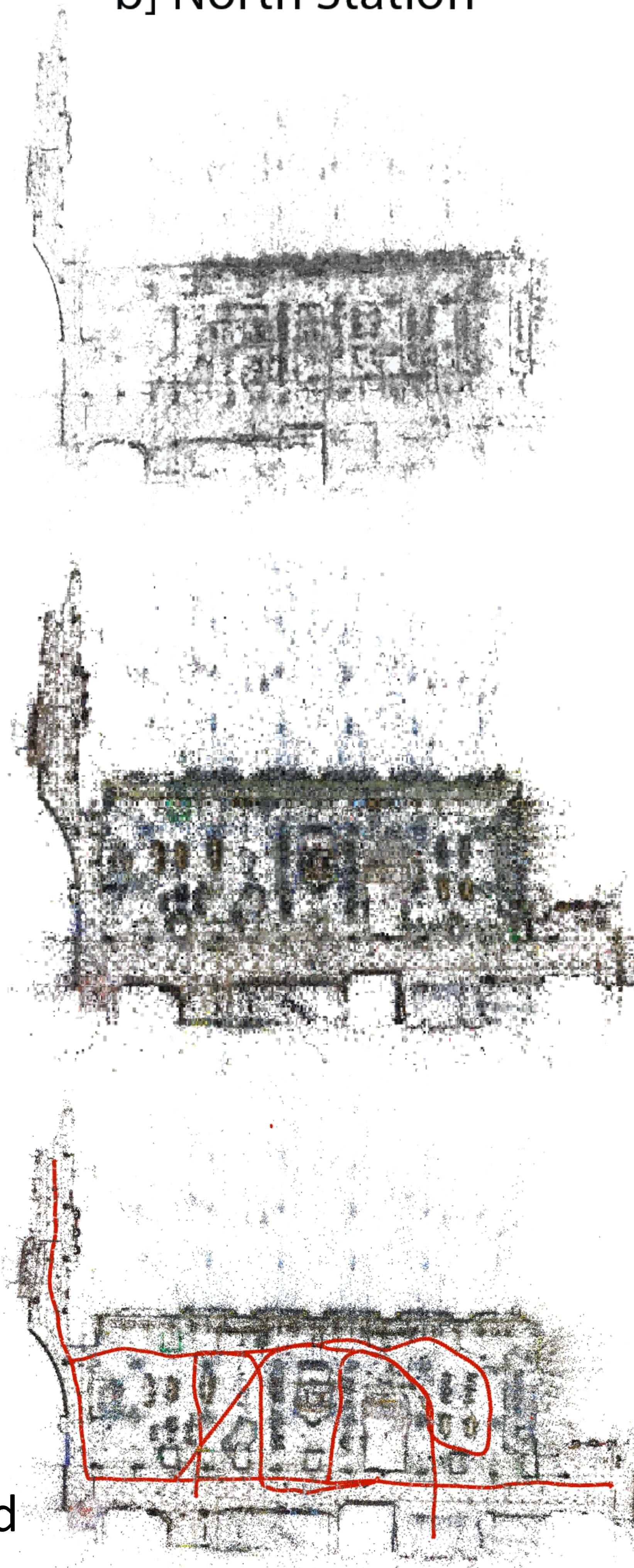- Significant spatiotemporal structure of capture process is not leveraged in map generation

Solution:

- Integrate knowledge of spatiotemporal structure during map generation

- The result: a unified, denser spatial map allows for improved navigation

a] Campus Center F1   b] North Station

Manually Combined

Proposed SMG

Point cloud with camera path
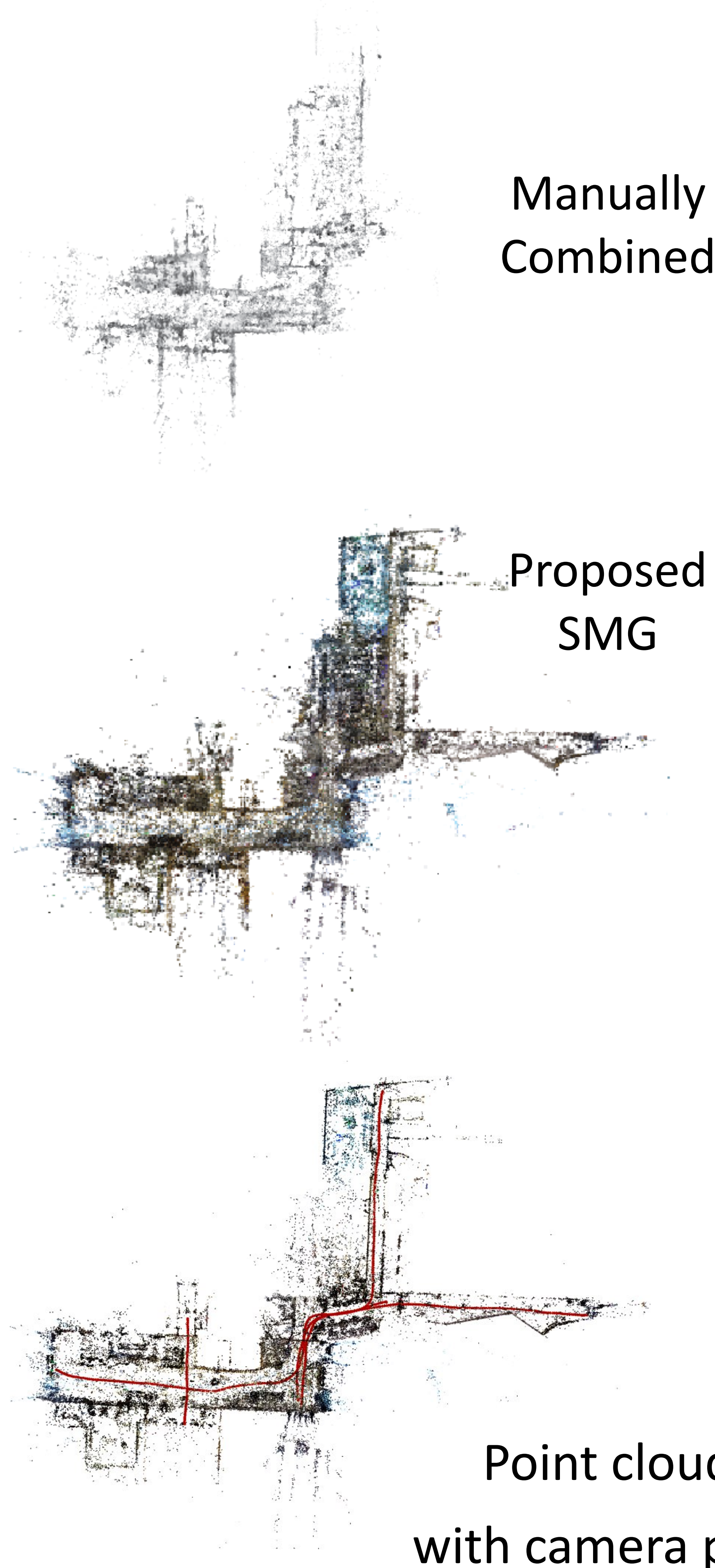
Scientific Impact:

- We develop a custom spatial map generation module that uses video inputs from multiple cameras

Broader Impact:

- Our system braces the blind and visually impaired populace to traverse indoors without assistance.

- Results also applicable to settings that demand autonomous indoor navigation.

- *Remaining work:* Quantifying improvement by processing acquired dataset that includes ground truth labels for localization