## FAB-MAP 3D: Topological Mapping with Spatial and Visual Appearance R. Paul and P. Newman (ICRA 2010)



- A probabilistic framework for appearance based navigation and mapping using spatial and visual appearance data
- A bag-of-words approach in which positive or negative observations of visual words in a scene are used to discriminate between already visited and new places
- Representing locations as random graphs and learning a generative model over word occurrences as well as their spatial distributions
- Special care for multi-modal distributions of inter-word spacing and for sensor errors
- Viewpoint invariant inter-word distances as strong place signatures
- Evaluated on a dataset gathered within New College, Oxford
- Increased precision-recall area compared to a state-of-the-art visual appearance only
- Reduced false positive and false negative rate by capturing spatial information, particularly in loop closure decision hinges