

CSCI-4290/6290: Robot Motion Planning  
Lecture 14: October 10, 2003  
**Probabilistic Roadmaps**

## Announcements

- Assignment 3 is due today at the beginning of class.
- The next class is on Friday, October 17!
- Assignment 4 is due on October 21.
- The midterm exam is on Tuesday, October 28 in class from 12:00pm to 1:50pm. It will be a closed book and closed notes exam.

## Today's Class

Today we continue our discussion of the basic *probabilistic roadmap* technique.

1. Probabilistic roadmaps (PRMs)
2. PRM variants:
  - (a) Obstacle-Based PRM
  - (b) Medial Axis PRM
  - (c) Lazy PRM: This is a single query PRM variant that attempts to improve performance by reducing the number of collision checks.
  - (d) Visibility PRM

## Reading

Chapter 7–7.2, Choset et al.

Chapter 6.7–6.8, *Planning Algorithms* by LaValle.

## Additional References

“A Randomized Roadmap Method for Path and Manipulation Planning”, N. M. Amato and Y. Wu, IEEE International Conference on Robotics and Automation, pages 113-120, Minneapolis, MN, April 1996.

Motion Planning for a Rigid Body Using Random Networks on the Medial Axis of the Free Space, Steven A. Wilmarth, Nancy M. Amato, Peter F. Stiller, Proceedings of the 15th Annual ACM Symposium on Computational Geometry (SoCG'99), June 1999, pp. 173-180.

Path Planning Using Lazy PRM, R. Bohlin and L.E. Kavraki, *IEEE International Conference on Robotics and Automation*, pages 521–528, San Francisco, April 2000.

Visibility based probabilistic roadmaps for motion planning, T. Simeon, J.-P. Laumond, and C. Nissoux. *Advanced Robotics Journal* 14(6) (2000).

## Next Class

Rapidly-exploring random trees (RRTs)