# Basic Models for Robot Motion and Perception

## States and Actions

# Models

We need precise ways to describe how robots behave.

Specifically, we'll need models for:

- the way robot moves
- the information it receives from its sensors
- the plans it forms to achieve its goals

Some key ideas are **states**, **actions**, **transitions**, and **observations**.

# States

The **state** describes what is happening at a given point in time.

> **Definition**
> The **state** is the collection of all aspects of the robot and the environment that can impact the future.

Notation:

- state: $x$
- state space: $X$

[Thrun, p20]

# Actions

**Actions** describe what the robot does.

> **Definition**
> The **action** is choice the robot makes at a particular time.

Notation:

- action: $u$
- action space: $U$