

# CAMBRIDGE ROBOTICS, AI, & TECH TRENDS

Executive Program



**Harvard  
University -  
Cambridge, MA**



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# COURSE OBJECTIVES

## Program Highlights

- Introduction to augmented reality
- Extracting design principles from biology
- Biological perception: robots recognizing human intent
- Ants as instructors of network efficiency
- democratizing databases
- Learning debrief and certificates ceremony



## Welcome to Cambridge Robotics, AI, & Tech Trends

**R**obotics and artificial intelligence (AI) are two of the most exciting and controversial fields trending now in the technology space. AI uses computer software to perform tasks that would usually require human

intelligence, while robots are machines that interact with the physical world programmatically. Both AI and robotics are being embedded into organization thus driving technology forward at a rapid pace.

# LECTURE ONE

## Introduction to Augmented Reality

From Pokemon Go to Google Translate, setting the done-ness of a slice of toast to adjusting the air conditioned temperature in a room, augmented reality (AR) allows humans to interact with their environments in ways never before possible. This lecture examines how AR entertains, informs, and connects us to the Internet of things, letting us essentially reprogram the world.

### Wanted More

"I wish I could have stayed even longer to continue exploring the topics and discussing new ideas with the professors."

*Mr. Chen Feng, General Manager  
Guangzhou Jingde Auto Parts Co., Ltd.*



# LECTURE TWO

## Memorable Training

“Our experience with the Harvard professors was great, something to be remembered for each and every person in our group for the rest of our lives.”

*Fabio Ruggiero  
Owner, Petrovino Seed Company*



## Extracting Design Principles from Biology

As early robotics researchers developed machines based on biological models -- human-like robots, for example -- they quickly discovered limitations. First, biological solutions rarely translate directly into the engineering domain, and second, when they do, there is little room for improvement on the existing design. This course examines a better approach: extracting design principles based on the task at hand, and allowing robot candidates to compete against one another to see which performs the task most efficiently.

# LECTURE THREE

## Biological Perception: Robots Recognizing Human Intent

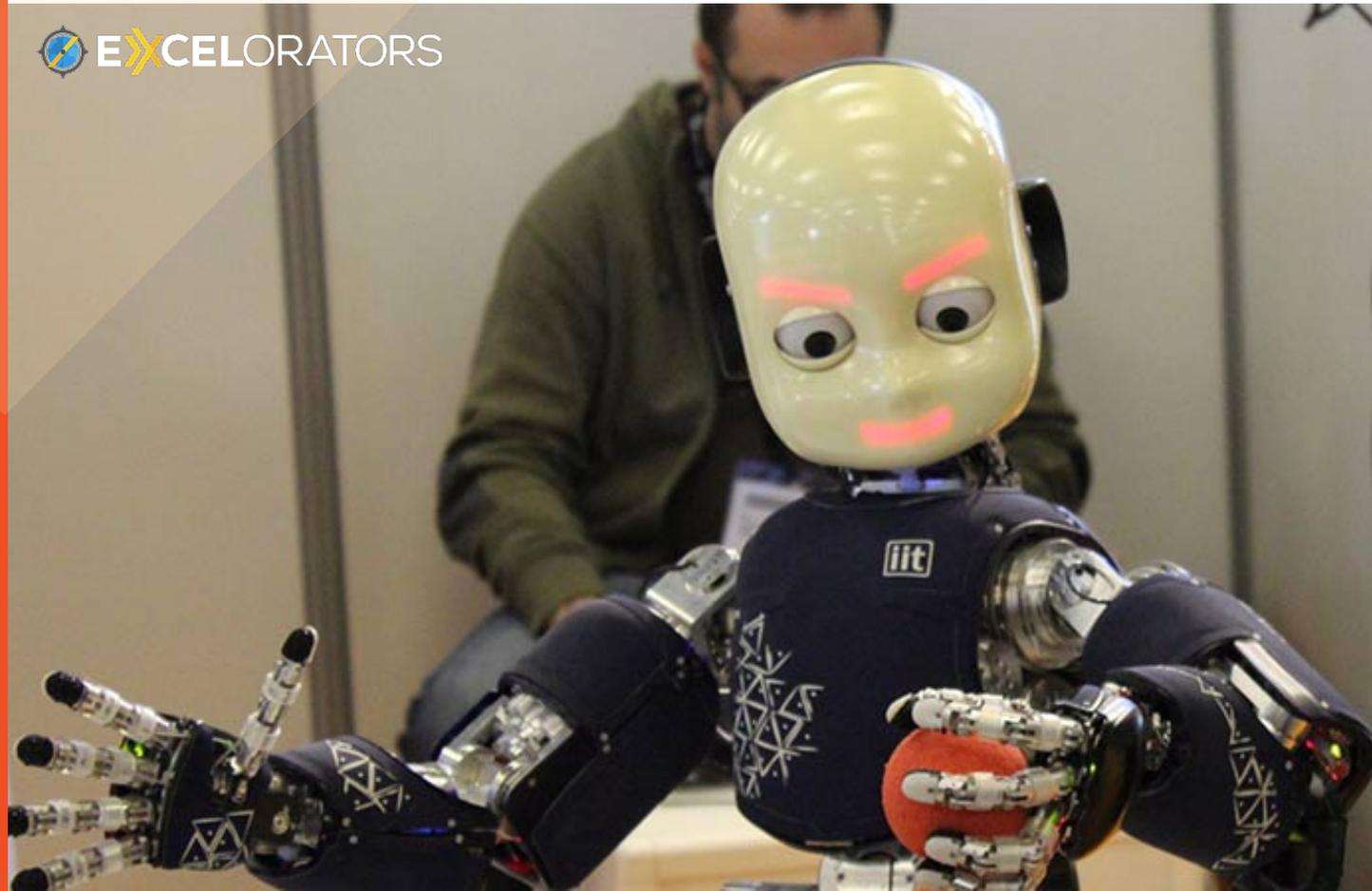
During collaborative tasks involving humans and robots, it is useful for the robot to understand what the human user is doing, and to anticipate what the user is likely to do in the future. The robot should gain this understanding based on observations of the user coupled with contextual knowledge of the human's activity. This lecture examines how computer scientists develop the AI models that allow robots to intelligently interact with their human collaborators as they simultaneously learn from human behavior.

 EXCELORATORS

### Eye-Opening

“I very much enjoyed this intensive one-day training. It helped me understand the American way of thinking. At the same time we learned a lot about ourselves through American eyes.”

*Ms. Wu Xue Yuan  
China Merchants Bank*



# LECTURE FOUR

## Ants as Instructors of Network Efficiency

Ants are extremely good at estimating the concentration of other ants in their vicinity. The ability appears to play a role in several community activities, particularly when selecting the site for a new nest -- by vote. This lecture explores how studying ant colonies may yield algorithms for network communication, allowing computers to better control robot swarms or even take stations in a distributed computer network on or offline.

### Best Training Experience

“I have traveled to the United States for training many, many times. This is the best training I ever experienced.”

*Mr. Han Dechang  
Deputy Director, Nankai Business School*



# LECTURE FIVE

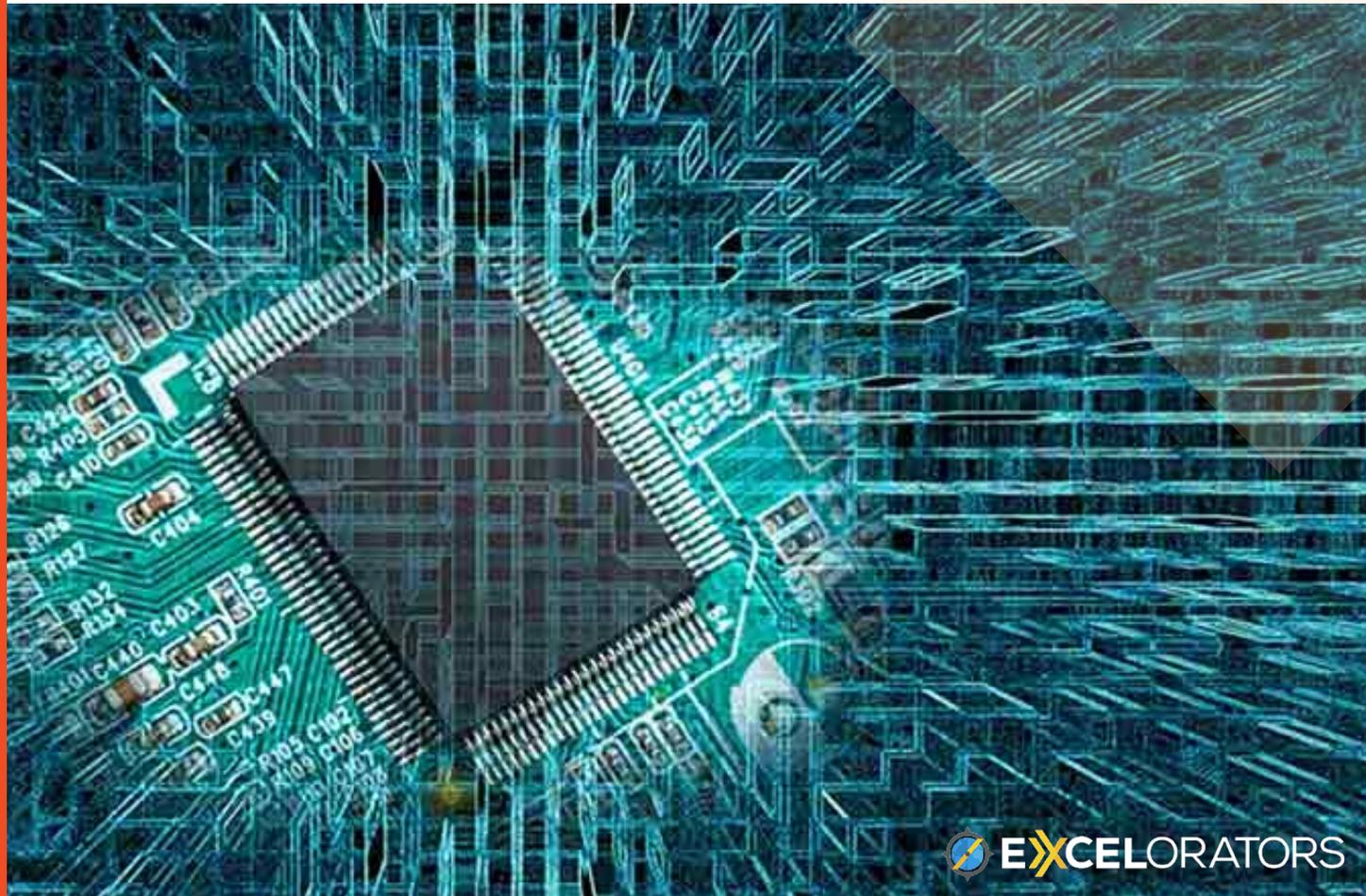
## Democratizing Databases

When an organization needs a new database, it typically hires a contractor to build it or buys a heavily supported product customized to its industry sector. This lecture explores cutting edge software being developed at MIT's CSAIL that will make working with databases much easier and more intuitive for lay people. Even in its prototype form, the program, which uses a familiar spreadsheet format that learns as the user performs tasks, may be easier to use than existing commercial database systems representing thousands, if not tens of thousands, of programmer hours.

### They Focused on the Practice

“The lessons I took at MIT were different than the lessons I used to take in China. The professors were wise, patient and careful. They focused on the practice, training me to to communicate with others, grasp complex issues, deal with the problems and work together with my partners.”

*Ouda Duan  
CTS Corporation*



# Program Schedule

## Lecture Topics

- **Introduction to Augmented Reality**
- **Extracting Design Principles from Biology**
- **Biological Perception: Robots Recognizing Human Intent**
- **Ants as Instructors of Network Efficiency**
- **Democratizing Databases**

## Experiences

- **Explore Harvard University/Campus Tour**
- **Interactive Case Studies**

## Corporate Visits

- **Corporate Visits with Successful Startups and Established Corporations**



## **Harvard University**

Harvard University is the standard by which all other research universities are measured. No school has ever challenged its position as the world's premier academic institution in the history of the Shanghai rankings. The school has produced 47 Nobel Laureates, 32 heads of state, and 48 Pulitzer Prize winners. It boasts the largest academic library in the world, as well as leading medical, law, and business schools. It has an integrated alumni network that stretches around the globe.

## **Boston, Massachusetts**

Boston is the capital and largest city of the Commonwealth of Massachusetts in the United States. One of the oldest cities in the United States, Boston was founded in 1630 by Puritan settlers from England. It was the scene of several key events of the American Revolution, such as the Boston Massacre, the Boston Tea Party, the Battle of Bunker Hill, and the Siege of Boston. The area's many colleges and universities make Boston an international center of higher education, including law, medicine, engineering, and business, and the city is considered to be a world leader in innovation and entrepreneurship.

## **Cambridge, Massachusetts**

Cambridge is a city in Massachusetts, across the Charles River from Boston. It's home to Harvard University and the Massachusetts Institute of Technology (MIT). At the heart of campus, grassy Harvard Yard is anchored by the neoclassical Widener Library. Harvard Square has cafes, bars and bookstores. The Harvard Art Museums comprise the Fogg, Busch-Reisinger and Arthur M. Sackler collections. Southeast is the prestigious MIT.



**Nicole Gilmore**

COO at Savanna, Harvard Innovation Lab Alumni, MassChallenge 2015 Finalist & 2016 Alumni-in-Residence. Nicole Gilmore is an Instructor of Economics and has extensive experience in business development both national and international.



**Cynthia Breazeal**

Dr. Cynthia Breazeal is an Associate Professor of Media Arts and Sciences at the Massachusetts Institute of Technology where she founded and directs the Personal Robots Group at the Media Lab. She is also founder and Chief Scientist of Jibo, Inc. She is a pioneer of Social Robotics and Human Robot Interaction.



**Eric Klopfer, PhD.**

Professor Klopfer's research focuses on the development and use of computer games and simulations for building understanding of science, technology, engineering and mathematics. He works on mobile and online games designed to build understanding of scientific practices and concepts as well as critical knowledge.



**Rik Eberhardt**

As Studio Manager for the MIT Game Lab, Rik Eberhardt spends his days playing Tetris: with people, boxes, task lists, equipment, money, and time. He is currently working towards a Serious Games MA Certificate from Michigan State University.

To arrange this training session with Excelorators or to develop a custom program, please contact us.



Huan Zheng



Bowen Gao



K.M. Finch

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