

# ***The AI Lectures from Tokyo:*** **An Experiment in Global Teaching**

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Zurich/Tokyo/Munich, September 2003

## **Mission**

Our goal is to communicate a series of lectures on modern Artificial Intelligence delivered by one of the most renowned researchers and teachers in the field, to a number of universities around the globe. Bringing together hundreds of students and researchers from all over the world, *The AI Lectures from Tokyo* aim at making the concepts of modern AI known to students and interested non-students worldwide and establishing a global AI community. On the basis of state-of-the-art technology and a novel method of knowledge transfer our experiment in global teaching aims at creating a highly interactive learning environment and taking today's potential in global teaching to the next level.

A major aspect of our project is to not only make cutting edge scientific content accessible to all students and researchers worldwide – but also to use science as a tool for intercultural communication. We believe that global teaching can be a fantastic tool to create intercultural discourse – to bring people from different cultures together who don't know of each other or would not share common activities in other contexts. We view scientists as natural ambassadors – and we believe that science has a political and social impact that we want to express and stimulate. Of course a well established intercultural and global scientific network exists already. We would like to visualize it and turn it into something that can be experienced and lived – an idea that is inspired by the notion of embodiment, the most crucial concept of modern Artificial Intelligence.

## **Background**

The idea for *The AI Lectures from Tokyo* originates from last year's Christmas lecture by Professor Rolf Pfeifer on modern Artificial Intelligence that was being broadcast via video conferencing from the University of Tokyo to the University of Zurich. The event was attended by more than a thousand students and was highly appreciated. Since Rolf Pfeifer is a visiting professor at the University of Tokyo for the winter term of 2003/2004 we thought it would be a great idea to stage such an event again – this time though on a larger and more ambitious scale. Thus *The AI Lectures from Tokyo* were born: There will be 10 lectures, and hundreds of students at five universities worldwide will be sharing these events. Participating universities in this unique experiment in global teaching are Tokyo, Japan; Zurich, Switzerland; Beijing, PRC; Munich, Germany; and Warsaw, Poland (see appendix I). The lecture series starts on November 4, 2003 and ends on January 27, 2004.

## **Motivation and goals**

There are a number of reasons why we believe that *The AI Lectures from Tokyo* constitute an exciting and important project. First, as we will argue below, the concepts of modern artificial intelligence have an impact that goes well beyond science and engineering proper. The ideas emerging from modern Artificial Intelligence provide novel ways of approaching not only scientific, but technological, social, and economic problems in the rapidly changing world of the 21<sup>st</sup> century. Thus modern Artificial Intelligence is a major contribution to the global knowledge society of today and tomorrow. Second, we will focus on the interplay of state-of-the-art video conferencing technology and *stage engineering* (i.e. methods of staging and presenting the lectures and interacting with the various sites during the lectures). Creating an interactive setting for several hundred students attending the lectures in different continents presents a challenge, but also offers opportunities for novel ways of communicating complex scientific materials. Third, the students will have the opportunity to experience the university life of their colleagues at the other sites and to engage in international networking. And fourth, this project provides a unique opportunity to study intercultural differences in use of technology, stage engineering, and community formation. Because the project has a strong event character we hope to attract many people from a large diversity of backgrounds. We do believe that this project bears the potential of having a significant political, social and economical impact. More specifically we hope to achieve the following goals:

- making the concepts of modern Artificial Intelligence known to as many academic and non-academic individuals as possible throughout the world;
- exploring and further developing methods of global teaching using the latest technologies in a loosely structured, open, intercontinental, interactive setting;

- experimenting with presence technologies; we believe that creating a sense of presence and community is crucial for distant teaching;
- establishing a global Artificial Intelligence community; additional media will be used for this purpose, particularly the website [www.tokyolectures.org](http://www.tokyolectures.org) will be a platform for establishing a lively and scientifically significant internet community;
- creating a network of institutions that on the one hand provides a globally accessible knowledge base on artificial intelligence, and on the other hand serves as a platform for emerging international cooperations between institutions in different continents;
- exploring the differences between local and distant teaching with a focus on the effectiveness of distant teaching; to what extent will local communities among students be created? are there cultural differences? to what extent do the methods need to be adapted to different cultural backgrounds?
- establishing a knowledge base on global teaching based on the experiences gained in this project; this is achieved by following up on all project activities and evaluating them by scientific studies.

We strongly believe the event character, the simultaneity and the interactivity of these lectures to be crucial to their success, which is why we do not think they should be only internet or CD-ROM based. At the same time we will be live streaming and later archiving the AI Lectures in order to make them accessible to all people worldwide on our website ([www.tokyolectures.org](http://www.tokyolectures.org)). Particularly students and researchers living in the US – which is, at least in this first run, not part of our global teaching project because of the time difference with Tokyo – are in this way given the possibility to participate.

## **Technology**

The folklore goes that video conferencing technology has already been around for more than twenty years and has become standard. While this may be true in principle, the technology has not been creatively applied, and for truly interactive events as the one foreseen in our project it has in fact not been available. Our experiment aims at not only providing excellent technical quality – but at creating a high sense of presence by making live interaction between students and teacher possible, by allowing students at the different universities to experience the university life at other sites, by showing the latest and hottest intelligent robots from Japan and other sites. It will be an event of high edutainment value with young people from different cultures congregating in a global space, and at the same time it will be a scientific event of prime quality and impact. The dense interactive character, the open intercultural environment, and the involvement of

hundreds of students and researchers around the world, make this project unique and like nothing we've seen in the context of distant-teaching so far.

The project *The AI Lectures from Tokyo* is part of our efforts in defining the 21<sup>st</sup> century as it aims at demonstrating how state-of-the-art technology can be applied to tackling some fundamental issues in the world for the benefit of all. Participating universities and sponsor corporations will profit by putting their name on the world map as leaders in Global Teaching and Artificial Intelligence. In addition, students will not only have fun and learn a lot about Artificial Intelligence and Global Teaching, but they will also benefit from the international community established by the project.

We want to emphasize that our project is an experiment. It remains to be seen whether we will succeed in realizing our ideas and goals. One major challenge besides the technical one is to coordinate people from the participating universities. We work on the basis of a rather small core team of approximately 10 people stationed in Zurich, Tokyo and Munich. Furthermore we have organized local project teams responsible for all organizational, technological, and academic aspects at each individual site. Altogether *The AI Lectures from Tokyo* are managed and realized by a team comprising more than 70 people in five different countries. When the first lecture starts in November 4, 2003, we will see whether we will succeed in getting this rather big and highly distributed team to run smoothly in unison. If it works, it will be a exemplary case of emergent project management and intercultural communication.

## **Modern Artificial Intelligence and its implications**

We now briefly outline the contents of the lecture series. The field of Artificial Intelligence has changed dramatically over the last 20 years. Originally intelligence was viewed in terms of algorithms or computer programs. While this view may be sufficient in formal or computational worlds like chess or logical reasoning, it has become clear that it cannot explain natural, adaptive forms of intelligence. The latter require a complete physical organism interacting with the real world: in other words, intelligence requires a body.

There are important implications of an embodied view of intelligence for science, engineering and management. One of the crucial insights is that intelligence is not a "box" sitting inside the brain, but is distributed throughout the organism and requires the interaction with the environment as an essential component. With respect to engineering, it can be demonstrated that systems that are not centrally controlled, and not hierarchical, tend to be more robust and adaptive – insights that can be directly applied to the design of robots (e.g. for demining, waste cleanup in hazardous environments, environmental exploration, service in hospitals and homes) and embedded systems, i.e. systems interacting autonomously with the environment. Embedded systems are used,

for example, in fuel injection devices, water purification plants, air conditioning systems, remote monitoring and control systems, as well as generally in systems designed for human computer interaction. Finally, companies and societies with an organizational structure based on local interactions and self-organization can be shown to react more robustly to unpredicted changes than hierarchically organized ones. This fact has been known for a long time, but there is now theoretical evidence from Artificial Intelligence research and corroboration from computer simulations supporting this point.

## **Program**

There will be ten lectures. The first one will be held on November 4, 2003, the last one on January 27, 2004 (see appendix II). Each lecture will be divided into two parts, the first one providing theory, the second consisting of illustrations from the latest research performed in Japan or the other participating sites. These illustrations will help to deepen the understanding of the theoretical issues but also add to the edutainment and event character of the lectures. The same goes for the last two lectures of the series where all participating sites will present research highlights and provide an outlook on future trends in AI.

## **Budget and sponsorship**

As this project implies considerable costs we are asking various institutions for funding. All the participating universities and other institutions, i.e. the Universities of Zurich, Tokyo, Munich, Warsaw, and Beijing, the Polish-Japanese Institute in Warsaw, as well as several private companies are sponsoring and supporting this project.

As these lectures will be broadcast to countries across the globe, an outstanding forum is provided to achieve global visibility. Moreover, there will be wide media coverage, offering additional market opportunities. Institutions participating in this project will have access to the experiences and results achieved. Moreover, they have the opportunity to be part of a pioneering experiment in defining the 21<sup>st</sup> century. These lectures should not be seen in isolation, but rather as a starting point for many exciting and instructive activities and events in the future. For example, additional lecture series in other areas of science could be broadcast using the infrastructure established and the know-how acquired during the project.

## Organization

There is a small core project team consisting of the following people:

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- Dr. Britta Glatzeder, Human Science Center, Ludwig-Maximilian University, Munich, and Artificial Intelligence Laboratory, University of Zurich: project management – [britta.glatzeder@imp.med.uni-muenchen.de](mailto:britta.glatzeder@imp.med.uni-muenchen.de)
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We envisage a two-stage process: The first one involves preparing and running the lectures. The second step is the follow-up, trying to draw conclusions and deciding on further activities (e.g. sequels of the lecture series, spin-off company, foundation).

## Appendix I:

### Sites of the global teaching experiment *The AI Lectures from Tokyo*

There were a number of considerations in choosing the sites. In order to keep the complexity within limits, the number of sites has been restricted to a maximum of five: Tokyo, Zurich, Munich, Beijing, and Warsaw. We did not include any sites on the American continent because of the time difference.



## **Appendix II:**

### **Time and dates of *The AI Lectures from Tokyo***

The lecture series comprises 10 lectures. All lectures will take place on Tuesdays.

#### **Time and Dates:**

Tuesdays, 9:15 – 11:15 AM CET (Central European Time) (approx.)

- Lecture 1: 4 Nov. 2003 – *Intelligence: An Eternal Conundrum?*
- Lecture 2: 11 Nov. 2003 – *Cognition as Computation: Why Did it Fail?*
- Lecture 3: 18 Nov. 2003 – *Embodied Intelligence: Basics*
- Lecture 4: 25 Nov. 2003 – *Synthetic Psychology: Designing from the Bottom up*
- Lecture 5: 2 Dec. 2003 – *Building Brains and Bodies: Artificial Neural Networks*
- Lecture 6: 9 Dec. 2003 – *The Emergence of Intelligence: Artificial Evolution and Morphogenesis*
- Lecture 7: 16 Dec. 2003 – *Theory of Intelligence: Design Principles for Intelligent Systems*
- Lecture 8 (final regular lecture): 13 Jan. 2004 – *Intelligence Revisited: Achievements and Challenges*
- Lecture 9: 20 Jan. 2004 – *Future Trends 1*
- Lecture 10: 27 Jan. 2004 – *Future Trends 2*

*Future Trends* sessions aim at adding to the edutainment value: The latest and hottest robots and projects in Artificial Intelligence will be presented personally by the researchers, including robot demonstrations, video clips, short explanations; this will also be interactive and provide the opportunity for students to ask questions.

**Program (approximate times, CET):**

- for lectures 1 to 8:
  - 8:45 – 9:15 trailer, music, informal student life
  - 9:15 – 10:00 lecture (presentation of materials, theory – the regular class)
  - 10:00 – 10:20 coffee break
  - 10:20 – 11:00 presentation of latest robots and projects from Japan and other participating university sites
  - 11:00 – 11:15 informal student life
- for lectures 9 and 10:
  - 8:45 – 9:15 trailer, music, informal student life
  - 9:15 – 10:00 the latest and hottest robots as well as research projects in Artificial Intelligence will be presented personally by the researchers, including robot demonstrations, video clips, short explanations; this will also be an interactive process and will provide the opportunity for students to ask questions.
  - 10:00 – 10:20 coffee break
  - 10:20 – 11:00 continuation of robots/projects presentation
  - 11:00 – 11:15 informal student life