

2017 International Conference on Solid State Devices and Materials
= Short Course A =
Artificial Intelligence (AI) for the Application of Solid State Devices and Materials
September 19, 2017 Sendai International Center, Sendai, Japan

Organizer

Prof. Kenji Shiraishi (Nagoya University)

Speakers

13:00-14:30 **“Basics of Artificial Intelligence: Machine Learning and Data Analysis”**

Mr. Kento Ohtani (Nagoya University / Human Dataware Lab. Co., Ltd.)

In this lecture, I will explain the basics of artificial intelligence (AI) and how data is used for AI. AI is what we call computer programs which are capable of solving problems or making decisions without human assistance. AI has many applications, which range from entertainment (playing the role of an opponent or creating scenarios in video and board games) to real-world uses, for example, in the fields of automated driving (decision making, mapping), medical care (diagnosis, drug selection, patient monitoring) and material science (discovering and developing new materials), etc. First I will outline AI and describe some of its possible applications, and will then explain one of the basic technologies used in advanced AI systems, machine learning, and how to collect and handle data for use in machine learning. I hope that you will find the idea of machine learning interesting and that this lecture will introduce you to some of its possible applications in the field of material science, such as predicting the physical properties of new materials, or for analyzing images of existing materials to understand their properties, so that you can use AI to contribute to your research.

14:30-15:20 **“Materials Informatics”**

Prof. Shinji Tsuneyuki (The University of Tokyo)

Break (20min.)

15:40-16:30 **“How to Use Informatics in Crystal Growth Process”**

Prof. Toru Ujihara (Nagoya University)

16:30-17:20 **“Possibilities and Expectation of Materials Informatics for Device and Material R&D”**

Dr. Shigetaka Tomiya (Sony Corporation)

In recent years, while the importance of device and material is increasing, research and development (R&D) of device/material becomes more and more sophisticated and complicated, and, thus, required time and cost are on a rising trend. Because of a such background, efficient R&D is strongly expected. Advanced materials analysis and simulation are important to understand things and phenomena essentially. In addition, use of the simulation is becoming indispensable to reduce the number of experimental trials and design reworks. However, these are not enough now and it is inevitable to incorporate the data science called the fourth science, that is, Materials Informatics (MI) into devices and materials R&D.

Here, after showing perspective of MI, we will look over overseas trends and discuss what we should do to make MI more useful not only for R&D but also for manufacturing.