

The Future our R&D is Creating

# Transforming R&D with DX — Integrating materials informatics

Amid the rapid changes in our society, the Toyobo Group is aiming to use IT and DX to bring out the full potential of its technologies in various areas. Materials informatics (MI) is one of the key technologies we are integrating to our R&D operations. MI applies information science (informatics) methods with AI, machine learning, and statistical analysis to efficiently identify and develop materials.

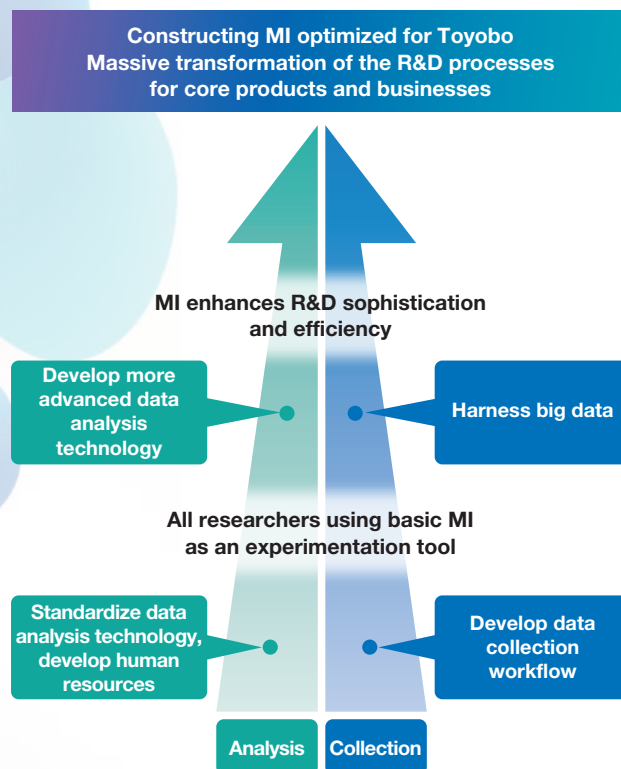
We are harnessing the power of digital technology to accelerate the creation of new solutions and businesses.

## Building a structure to utilize materials informatics throughout the Company

In fiscal 2021, the Group established the IT and DX Planning Department at the head office and the DX Promotion Office at the Research Center. These two departments are spearheading construction of the optimal MI system, which will enable a significant advance in the R&D processes for the Group's core products and businesses. The first objective is for all of our researchers using basic MI as an experimentation tool by the end of fiscal 2023.

Key will be storing and analyzing the experiment data. As we build a database capable of continuously collecting and storing experiment records from all of the Group's research centers, we will train analysts and standardize the technology needed for the data analysis.

Following is an interview with a Toyobo researcher who is using and developing MI at the Research Center.



## Making the technology as easy to use as possible

### Developing analysis technology

I work in two departments, the DX Promotion Office and the Computational Research Center. The DX Promotion Office is working with the people who will actually be using the MI with the aim of creating worksites where MI can easily be used. To that end, the office is creating a learning structure for MI-based analysis and the software needed for the analysis. I have worked on experiments as a researcher and understand that people who have not used MI before could feel reluctant to use it. That is why I'm always trying to make the software as easy to use as possible for people who are unfamiliar with the programs or digital tools.

At the Computational Research Center, we are working with the people who will actually be using the MI for experiments to broaden the range of areas where the MI will be used. In the future, we want to combine the MI and simulation to help further advance our material development.



Natsuki Ito

Computational Research Center, Corporate  
Research Center and DX Promotion Office,  
Research Center



**Masafumi Shibuya**

Advanced Processing Technology Unit  
Corporate Research Center

## I want to examine and use data from both inside and outside the Company

**MI and research on seawater desalination membranes**

My research group is developing next-generation seawater desalination membranes. Membrane production must satisfy certain conditions, but each condition has numerous parameters and there is never enough time to test every parameter. We use MI to instantly organize the parameters and create the optimum production conditions. My group has just begun using MI, and we are both arranging the parameters and gathering data at the same time. I'm looking forward to sharing information with the DX Promotion Office so we can quickly develop the MI system to its full potential.

Collecting in-house data is undoubtedly important, but so is data from outside the Company, such as research papers and patents, so in the future I would like to also actively incorporate public data into our analysis. However, public data is not necessarily correct, so we will need to apply our own analysis to verify its veracity.

## MI provides new perspectives on R&D

**MI and research on conductive adhesives**



**Michihiko Irie**

Chemical Research Unit  
Corporate Research Center

I use MI to accelerate the R&D on conductive adhesives. I struggled with using MI at first because it was a different approach from the usual R&D processes. However it was extremely quick to find materials which in my experience wouldn't normally be considered. As we continue using MI, I think it will enable even employees with minimal experience to engineer materials like experienced professionals. I also think that improving our R&D efficiency will lead to workstyle reform. Since I'm the team leader, I would like my team members to all be using MI as a normal part of their jobs.

I also think we need to rethink where we have our researchers expend their energies. Using MI will open up time for us to focus our attention in other areas. I would like to use that time to look at outcomes that are different from conventional knowledge, and analyze and consider what mechanisms are at work.



**Masami Hamano**

Vylon Technology Center  
Hardlen and Vylon Development Department

## Collecting the data needed to find solutions

**MI and the development of copolymerized polyester**

At the Vylon Technology Center, we are using MI for both the analysis and collection of data. The ultimate goal is to be able to input the resin composition to the MI and instantly be able to determine the physical properties. We are improving our analysis methods and accumulating the data we will need to make that possible. Since ensuring accuracy will need a considerable amount of data and time, this is a multiyear project.

For the business divisions, it is important how quickly we can respond to customer requests for products. In the past, researchers would rely on their experience and repeated trial and error until they found the right solution. Sometimes we lost customers to competitors because they were quicker to produce a solution. Increasing the use of MI will make us faster and boost the competitiveness of our business divisions.