

<https://www.ntt-review.jp/archive/2023/202307.html>



## View from the Top

- ▶ Riaki Hoshino, Senior Executive Vice President, NTT EAST

## Front-line Researchers

- ▶ Hirokazu Kameoka, Senior Distinguished Researcher, NTT Communication Science Laboratories

## Rising Researchers

- ▶ Kentaro Yasu, Distinguished Researcher, NTT Communication Science Laboratories

## Special Report

### Commemoration of the Japan Prize

- ▶ Keeping in Mind the Spirit Acquired at NTT Laboratories, We Will Continue to Challenge Ourselves to Contribute to the Development of Humankind

## Feature Articles

### The Forefront of Cryptography Research with an Eye on the Quantum Era

- ▶ Development of Modern Cryptography and Research on Quantum Cryptography
- ▶ Functional Encryption Enabling Secure Leasing of Private Keys
- ▶ Quantum Algorithms with Potential for New Applications
- ▶ Security of Hash Functions against Attacks Using Quantum Computers

## Regular Articles

- ▶ MagneShape: A Simple Pin-based Shape-changing Display Using Magnetic Materials

## Global Standardization Activities

- ▶ Efforts by TM Forum, an Operation Standards Organization

## View from the Top

### Riaki Hoshino, Senior Executive Vice President, NTT EAST

#### ▼ Abstract

NTT EAST strives to connect with the communities in which it operates and to build circular communities that can develop sustainably. This initiative has been accompanied by efforts for further strengthening the resilience of telecommunication networks to counter new threats such as escalating natural disasters and increasingly sophisticated cyber-attacks, and improving its crisis-management and mobility capabilities to provide a high-quality and stable telecommunication infrastructure. We asked Riaki Hoshino, senior executive vice president of NTT EAST, about the company's initiatives and his beliefs as a top executive.



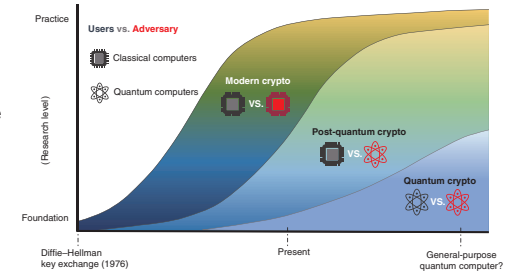
## Feature Articles

### The Forefront of Cryptography Research with an Eye on the Quantum Era

#### Development of Modern Cryptography and Research on Quantum Cryptography

#### ▼ Abstract

The foundation of modern cryptography developed in 1976 considered security by modeling adversaries as polynomial-time Turing machines. However, recent advances in developing a general-purpose quantum computer have made a significant impact on modern cryptography because it overturns the security model. NTT's research on cryptography aims to provide technologies to ensure the security of modern information systems and create applications when quantum computers become widespread. This article reviews the 40 years of cryptologic research at NTT and outlines our current efforts.



## Regular Articles

### MagneShape: A Simple Pin-based Shape-changing Display Using Magnetic Materials

#### ▼ Abstract

Pin-based shape-changing displays provide dynamic shape changes by actuating numerous pins. However, the large number of actuators required to move so many pins complicates the electrical path and mechanical structure, and creates a need for significant resources if one is to build such a display. Therefore, my research colleague and I proposed a simple pin-based shape-changing display, called MagneShape, that outputs shapes and motions without any electronic components. MagneShape consists of magnetic pins, a pin housing, and magnetic sheet. The magnetic force generated between the magnetic sheet and the magnetic pins levitates the pins vertically. We devised two methods for fabricating alternative magnetic pins, devised a method for controlling the magnetic pins, and developed design tools for MagneShape.

