## Moonshot Research and Development Program

The Moonshot Research and Development Program led by the Cabinet Office is a large-scale national research and development program with funding of over 100 billion yen for up to 10 years. It aims to link the results of original basic research originating in Japan to 'disruptive innovation'. The purpose is not to expand upon existing technology, but to conduct challenging research and development based on daring ideas.

Tohoku University has adopted nine projects for this program as of July 28, 2022. By participating in the program through the selected projects, Tohoku University will contribute to building a society where well-being can be realized.

<Moonshot Goal>

- MS Goal 1 Realization of a society in which human beings can be free from limitations of body, brain, space, and time by 2050.
- MS Goal 2 Realization of ultra-early disease prediction and intervention by 2050.
- MS Goal 3 Realization of AI robots that autonomously learn, adapt to their environment, evolve in intelligence and act alongside human beings, by 2050.
- MS Goal 4 Realization of sustainable resource circulation to recover the global environment by 2050.
- MS Goal 5 Creation of the industry that enables sustainable global food supply by exploiting unused biological resources by 2050.
- MS Goal 6 Realization of a fault-tolerant universal quantum computer that will revolutionize economy, industry, and security by 2050.
- MS Goal 7 Realization of sustainable care systems to overcome major diseases by 2040, for enjoying one's life with relief and release from health concerns until 100 years old
- MS Goal 8 Realization of a society safe from the threat of extreme winds and rains by controlling and modifying the weather by 2050.
- MS Goal 9 Realization of a mentally healthy and dynamic society by increasing peace of mind and vitality by 2050.

**Nine projects from our university have been selected for this project.**

| Moonshot Goal | Project Manager | Research Subject |
|---|---|---|
| MS Goal2 | Graduate School of Medicine<br>Professor. Hideki Katagiri | Challenge for Eradication of Diabetes and Comorbidities through Understanding and Manipulating Homeostatic Systems |
| MS Goal3 | Graduate School of Engineering<br>Professor. Yasuhisa Hirata | Adaptable AI-enabled Robots to Create a Vibrant Society |
| MS Goal3 | Graduate School of Engineering<br>Professor. Kazuya Yoshida | Self-Evolving AI Robot System for Lunar Exploration and Human Outpost Construction |
| MS Goal4 | Graduate School of Life Sciences<br>Project Professor. Kiwamu Minamisawa | Mitigation of greenhouse gas emissions from agricultural lands by optimizing nitrogen and carbon cycles |
| MS Goal4 | Graduate School of Environmental Studies<br>Professor. Yasuhiro Fukushima | Development of Combined Carbon Capture and Conversion (quad-C) modules targeting low carbon dioxide concentration gases for balancing the global carbon budget |
| MS Goal7 | Graduate School of Biomedical Engineering /Graduate School of Medicine<br>Professor. Takaaki Abe | Mitochondrial Medicine |
| MS Goal8 | Graduate School of Engineering<br>Associate Professor, Taku Nonomura | Actuator Position Optimization for Large-Degree-of-Freedom Fields |
| MS Goal9 | Graduate School of Life Sciences<br>Professor. Kenichiro Tsutsui | Development of "At-will Translator" connecting various minds based on brain and body functions. |
| MS Goal9 | Graduate school of information science<br>Associate Professor, Chihiro Hosoda | Child care commons : Proposing social infrastructure allowing others to substitute parental roles |