

## Research topics for graduate students for 2024.

### Professor Naohiko Sugita

Department of Mechanical Engineering

Acceptable course(s)

- Master's Degree
- Doctoral Degree



#### Research Topics

Advanced Manufacturing Laboratory consists of three groups: Machining/Machine Tools, Laser Processing, and Medical Applications. While each of these groups has different areas of expertise, they share the common theme of production engineering and conduct basic and applied research.

#### 1. Machining/Machine tools

This group conducts research on the design and evaluation of machine tools. Machine tools are necessary for the machining of various products, and their performance directly affects the quality of products. The group builds numerical models of machine tool structures. We develop methods to predict and evaluate machine tool behavior and machining accuracy through simulations and experiments. The group also studies machine tool control technology to achieve highly accurate, highly efficient, and high-quality machining.

#### 2. Laser processing

This group conducts research on the application and development of laser processing. Lasers are a light source with high energy density and directionality, making them suitable for processing a wide variety of materials. This group uses lasers to research the processing and surface modification of difficult-to-machine materials such as metals, ceramics, and diamonds. They are also working on improving the laser source, aiming to create new laser processing technologies. Laser processing technology is used in many industrial fields due to its accuracy and efficiency.

#### 3. Medical application

This group conducts research on the development and application of medical devices. We are conducting research on medical devices in the field of orthopedics. This group works on the development of new medical technologies and the improvement of existing medical technologies. It also develops new methods to evaluate the safety and effectiveness of medical devices. Advances in medical technology are essential to improving the quality of life.

Lab. Web page: <https://www.mfg.t.u-tokyo.ac.jp/>