The Connection Between Health, Welfare, Medicine, and Technology
— Innovation is the key to making the world better —

A 13 Gyosei International School
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BACKGROUND

In developed countries medical technology is essential in treatment, but they are not accessible to developing counties easily. And only a few people know how these technologies were made and understand the ideas of their manufactures and inventors.

WOLRD PROBLEMS TO BE SOLVED

- Medical crisis in Venezuela
- Preventable deaths in poor countries
- Expensive rehabilitation treatment
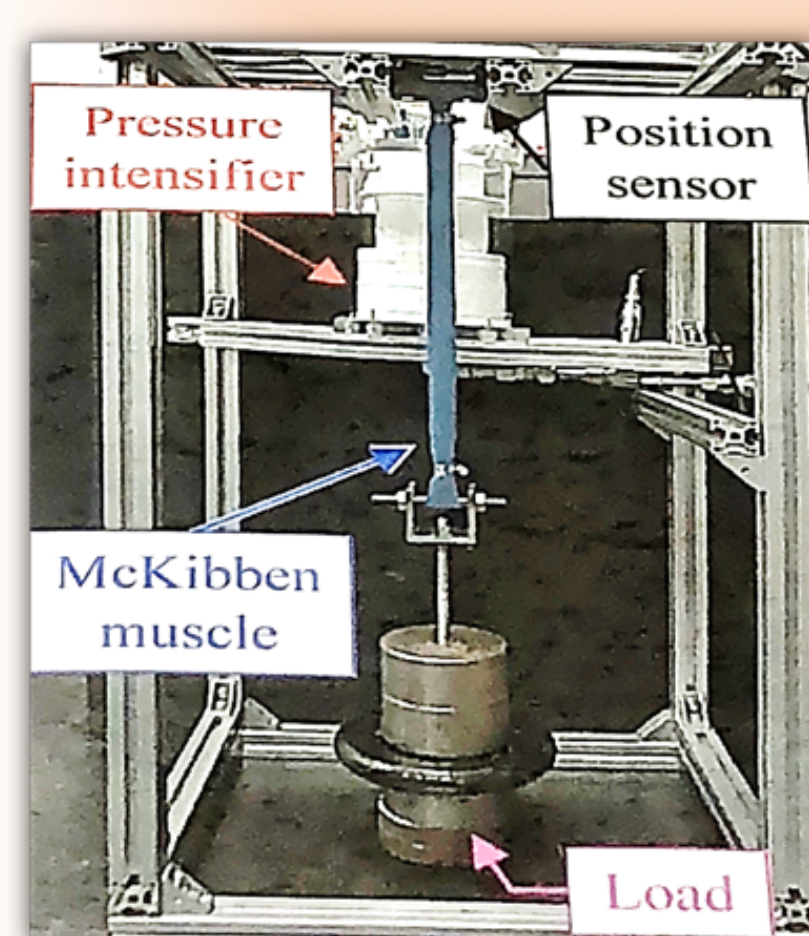
THE ENGINEERING DESIGN PROCESS

- **TEST** • Evaluate prototype
- **IMPROVE** • To Release • To sell to makers
- **ASK** • Identify what has not been engineered
- **RESEARCH** • the problem and needs
- **IMAGINE** • Possible problems • What can be made
- **PLAN** • A research method
- **CREATE** • a prototype

INTERNSHIP EXPERIENCE AT SIT

Site: Environment and System Control Lab.
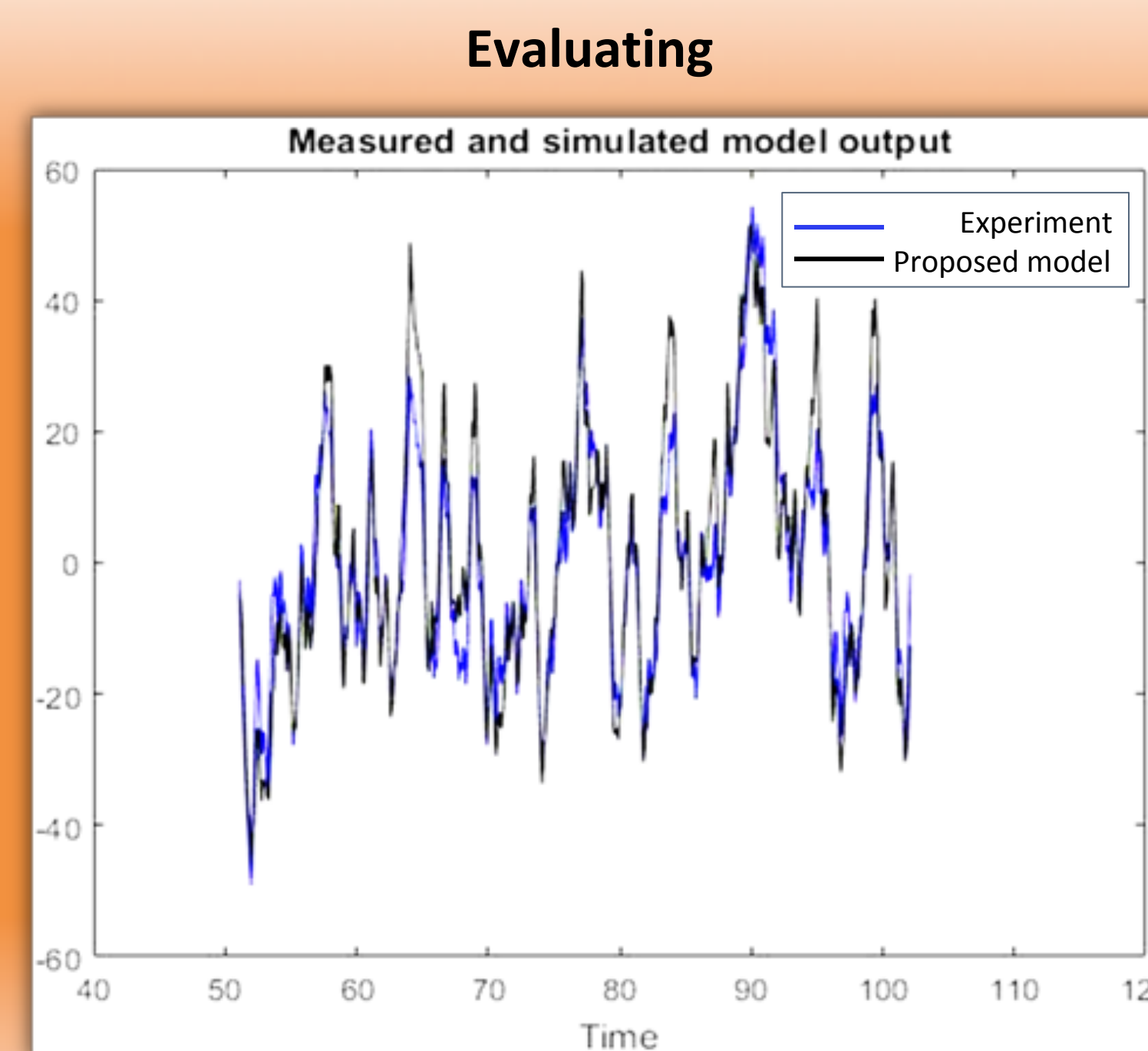in Shibaura Institute of Technology

Main Activities:
- Developing application and system such as Water hydraulic-driven artificial muscle control system
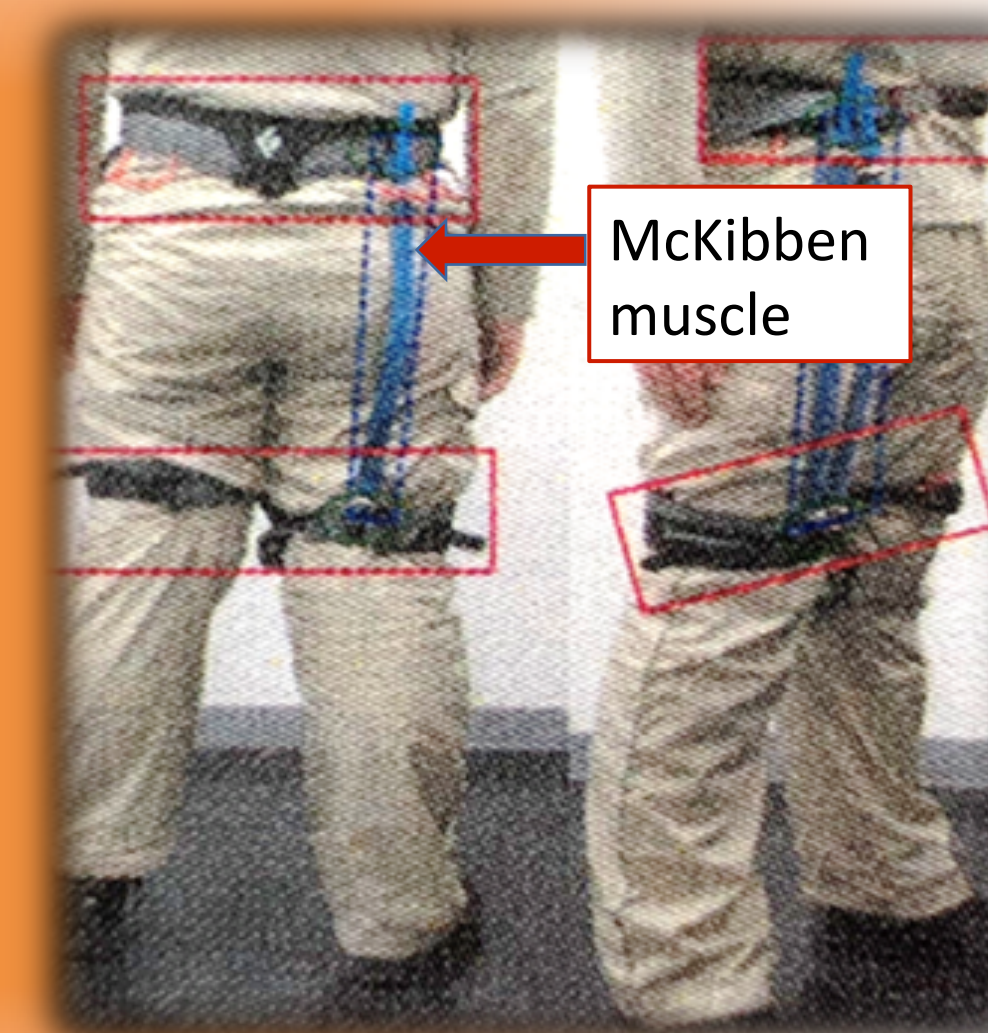
"Tap-Water Driven McKibben Type Artificial Muscle"

Testing

Evaluating — Measured and simulated model output — Experiment / Proposed model

The Product in development — McKibben muscle

$$y(t)=ay(t-1)+bu(t-1)$$

(a, b =coefficients or parameters, y = input, u = output, t = step)

My Mission:
- Theoretically understanding control engineering
- Making a mathematical model for testing, and estimating parameters in the model
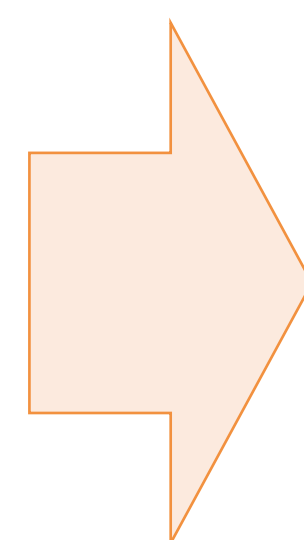- Experimenting with the artificial muscle

What I found out
- The existence of old and new paradigms
- Mathematical model used in the world of engineering

KOPERNIK FINDING WHAT WORKS

Orihime, Ory Lab Inc.

OLD PARADIGM

- Technology was more expensive, big and difficult to use.
- Personal expenses were costly when experimenting in the field.
- Some devices, e.g. machines for rehabilitation, were not adaptable to the environment of developing countries.

NEW PARADIGM

- Cheaper, smaller, and easier to use
- Having the capability for diverse use
- development has become more efficient and universal, e.g. by sharing mathematical model.
- **Simple innovations by the developer can** bring advanced technologies to developing countries.

CONCLUTION

- Knowledge we are learning at school is being pragmatically used for realizing ideas and innovation by the developers and makers.
- A high school student can foster and utilize a systematically organized body of knowledge, especially through STEM education. (STEM : Science, Technology, Engineering, and Math)