

Instructions and Goals in Our Laboratory

**Laboratory of Agricultural Process Engineering
Division of Environmental Science & Technology
Faculty / Graduate School of Agriculture**

Kyoto University



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Lab. of Agricultural Process Engineering is in compliance with Kyoto University's mission of "Tradition of academic freedom" and "Self-motivated learning"

Academic freedom tradition

Pursuing intellectual curiosity with an open mind in scientific manner
(Freedom of inquiry)

What is self-motivated learning?

Beside being highly motivated and self-disciplined learning within a curriculum, one is motivated to explore something new by oneself.

Mission of Lab. of Agricultural Process Engineering

A: Developing problem-solving skills

Problem-based learning is a pedagogical strategy for posing significant, contextualized, real world situations, and providing resources, guidance, and instruction to learners as they develop content knowledge and problem-solving skills. Through lectures, hands-on experiments, and real world experience, students collaborate to diagnose a problem as they strive to seek viable solutions.

B: Learning of the fundamentals of physical, biological and natural sciences and information technology

A student equipped with fundamental skill sets of physics, mathematics, natural sciences, and information technology have an advantage in securing a job as well as long term career development.

C: Learning agricultural knowledge and developing the application skills

Agricultural studies are dealing with complex living organisms and changing environments. A properly educated student through the curriculum is likely to gain the ability of variegated thinking and a multipronged perspective that could stimulate creativity and ability to benefit from paradigm shifts.



D: Learning engineering knowledge and developing the application skills

Measurement, control and system studies conducted on living organisms, soil and environmental are based on 4 fundamental engineering studies which develop problem solving skills. One of the features of this course is the combination of mission C and mission D that is applying engineering knowledge to meet bioproduction needs.

E: Nurturing creativity and innovation with courses on design

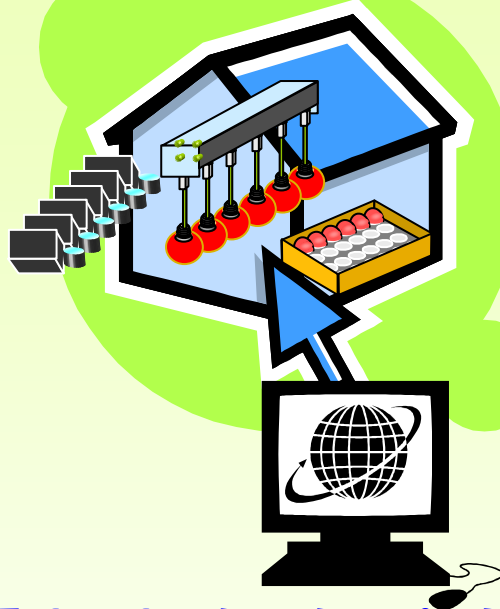
Creativity and sensibility skill can be developed through CAD course, machine design course and IT related courses. Besides, in the process of learning CAD, it also develop problem solving skills indirectly.

F: Developing communication and presentation skills (Prepare students for global community)

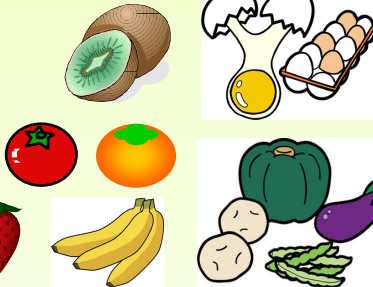
English language is an essential communication tool to extend our impact beyond domestic audience. To prepare our students, they are required to give presentations in English, in addition to Japanese, during their study in this division. Courses such as “English”, “Scientific English”, “Non-farm machinery books” and “Seminar” will be offered to prepare our students.



Post-harvesting, Non-destructive evaluation technology



IT for food and agriculture

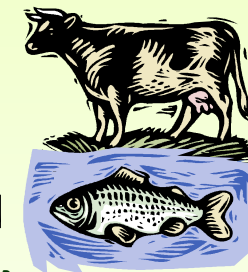
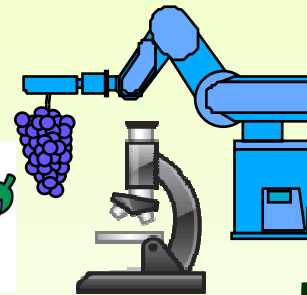


Measurement of agricultural product properties and substances

Environment control



Automation and robotization In controlled environment



Measurement on livestock and aquaculture

Our laboratory is taking engineering approaches to address production, and postharvest issues related to livestock, aquaculture, and specialty crops. In general, postharvest researches are focused on grading, processing, storage, shipping of agricultural crops and (livestock) dairy products. Although we cover a broad range of production systems, including greenhouse, plant factory, livestock, aquaculture plant, or even plant based life support systems for space exploration, measurements and analyses of physical, chemical, and physiological properties of agricultural crops are conducted at a fundamental level. Furthermore, the research related to the informatization technology for food safety and security are also being conducted for the improvement of product quality and income.

Main research themes of Our Lab.



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Research expectations in our laboratory

- Develop **communication skills** and **expertise knowledge** for effective information exchange with world class researchers internationally.
- Enhance **motivations** by exchanging views with students and researchers from internal and external.
- Develop **presentation skills** and variegated views through seminars and open seminars organized by the laboratory.
- Develop **creativity** through understanding and integration of engineering principles and agricultural/biological approaches.
- Develop critical thinking **skills to define problems** and improve analytical **skills to solve problems** effectively and efficiently.
- **Senior students** will present their research findings at the end of their study at national conferences.
- **Graduate students** will present their findings at least once a year at international conferences.
- Develop a core group of laboratory personnel (3-5 persons) to actively participate programming of international professional organizations.
- New comers (Senior students) learn about agricultural crop and food by joining small study groups consisting of senior laboratory members. The aim is to promote **self-motivated learning**.
- Without any prejudice being developed in each study group, student should pursue knowledge with an open mind in scientific manner

(Academic Freedom Tradition).



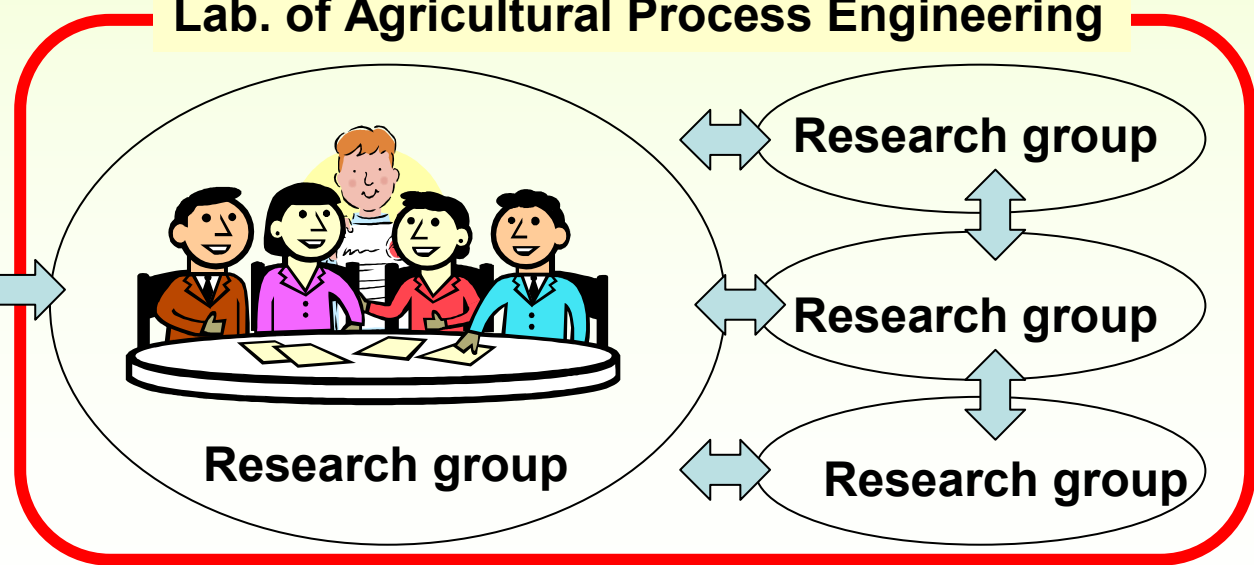
Research expectations in our laboratory

- Stay current with the **latest research findings** by both domestic and foreign researchers.
- Explore **new disciplines** to identify tools to cross fertilize our own field of study.
- **Improving the quality and quantity** of journal publications and conference presentations by having good communication among members.
- Nurture **world class researchers** of our field.

Researchers from overseas
and other universities



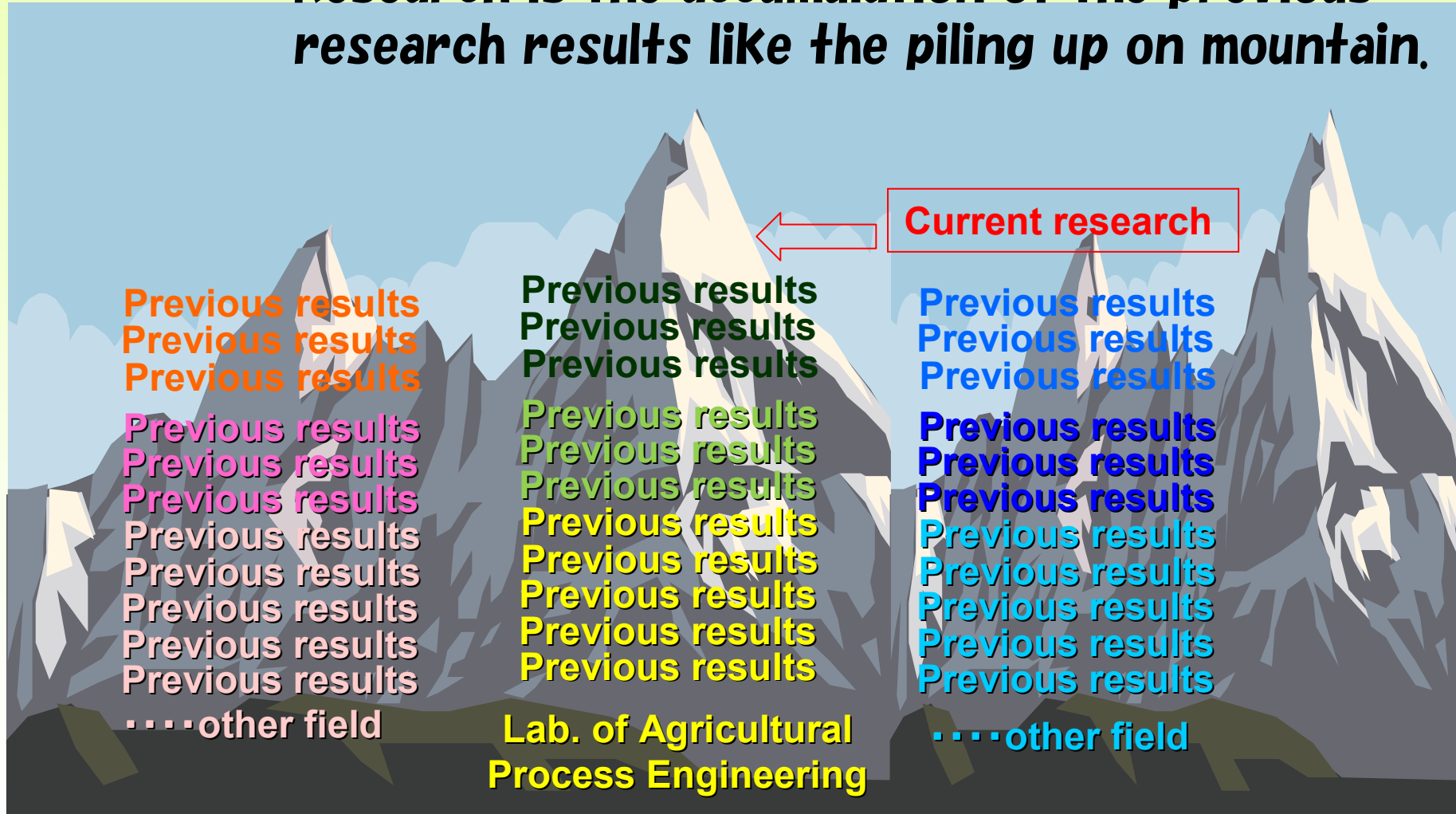
Lab. of Agricultural Process Engineering



- **Creativity** (or "creativity")
 - It is a mental process involving the generation of new ideas or concepts , or new associations between existing ideas or concepts.
- **Innovation**
 - Innovation may refer to both radical and incremental changes in thinking, in things, in processes or in services. Invention that gets out in to the world is **innovation**. In many fields, something new must be substantially different to be innovative, not an insignificant change, e.g., in the arts , economics , business and government policy.
- **Learning bioproduction**
 - To preserve our life line by securing food supplies that are sufficient, safe, high quality, and sustainable.
- **Preparing students for paradigm shift**
 - The world we are in is changing rapidly. To maintain our leadership, we need to be anticipate and sensitive to the change and shift our paradigm to meet new challenges.

What is research ?

Research is the accumulation of the previous research results like the piling up on mountain.



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Research circle



1. What are the problems? What can be solved with given resources? <Expertize knowledge, application skill, Defining problem>
2. Solving the defined problems above (By doing simulation or experiments) <Expertize knowledge, application skill, Defining problem>
3. Disseminate information: present study results at conferences, and publish journal articles <Presentation & communication skills>
4. Producing quality journals by addressing reviewers' comments. <Presentation & communication skills>
5. Based on the above, plan for new research topic. <Defining problem>

Repeating the above steps would improve the quality of researches.

