

## Recent Activities of JSME-IIP Division toward Advanced Information Society

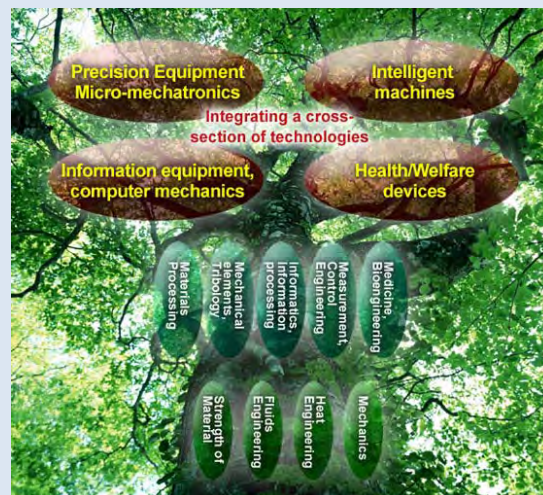
Akihiro MATSUMOTO  
(IIP division chair 2015, Toyo Univ.)

### From the Introduction of JSME-IIP website

- ....
- The feature of IIP Division is **to cover the area and the novel region** where **an existing study field and the technical field** were united and were developed.
- That is, if the basic study of mechanical engineering, such as strength of materials, fluid engineering, heat engineering, and mechanics, is assumed to be "**Warp**", it can be said that the IIP Division is a location of "**Woof**" by key words such as information, precision, intelligence, and the medical treatment, and is the section that can advance the creative effort in a standpoint near industry or the society.
- A main field of IIP Division includes information equipment, computer mechanics, precision equipment mechanics, intelligent machine, health/welfare devices.
- The **information equipment and computer mechanics have played the role of the tractor of the IIP Division** for these years by the research and development concerning peripherals such as a memory of the computer.
- ....

<http://www.jsme.or.jp/iip/English/Introduction/index.html>

## IIP: Information, Intelligence and Precision Equipment division



23 year history

Defined in JSME-IIP website at  
<http://www.jsme.or.jp/iip/index-e.html>

## Missions of IIP (declared in 2007)

- Cross-sectional technology integration
- Industry/academia collaboration
- Contribution to society: transmission of information
- widen the cover area of IIP from
  - information equipment,
  - intelligent equipment,
  - precision equipment
 to
  - Medical devices
  - Micro-mechatronics, nano-mechatronics, etc., but not limited to.

*From IIP 15<sup>th</sup> anniversary forum in IIP2007*

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## Similar societies in Japan

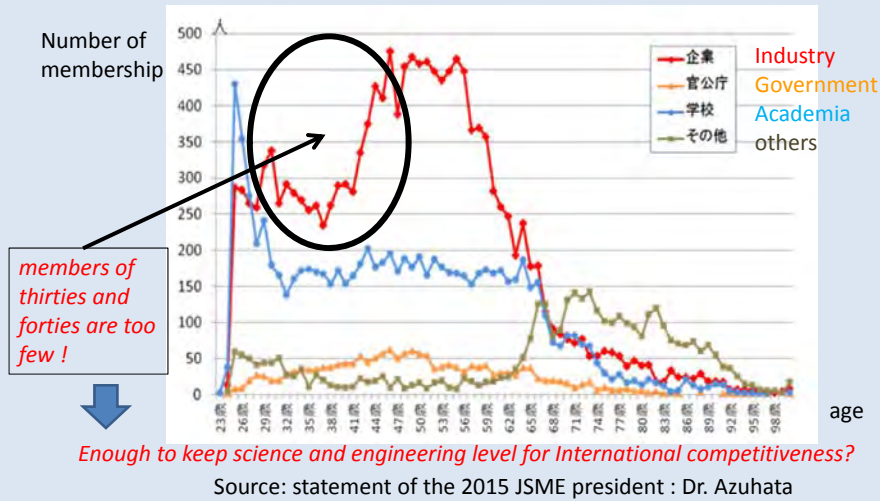
- Within JSME
    - Dynamics, Measurement & Control
    - Robotics & Mechatronics
    - Machine Design & Tribology
    - Bioengineering
    - Microengineering
    - Manufacturing & Machine Tool
    - Manufacturing Systems, etc.
  - Outside
    - RSJ (Robotics society of Japan)
    - JSPE (Japan Society of Precision Engineering)
    - SICE (Society of Instrumentation Control Engineers), etc.
- Clarification of different standpoint is indispensable!*

## I graduated from *the department of precision machinery engineering*

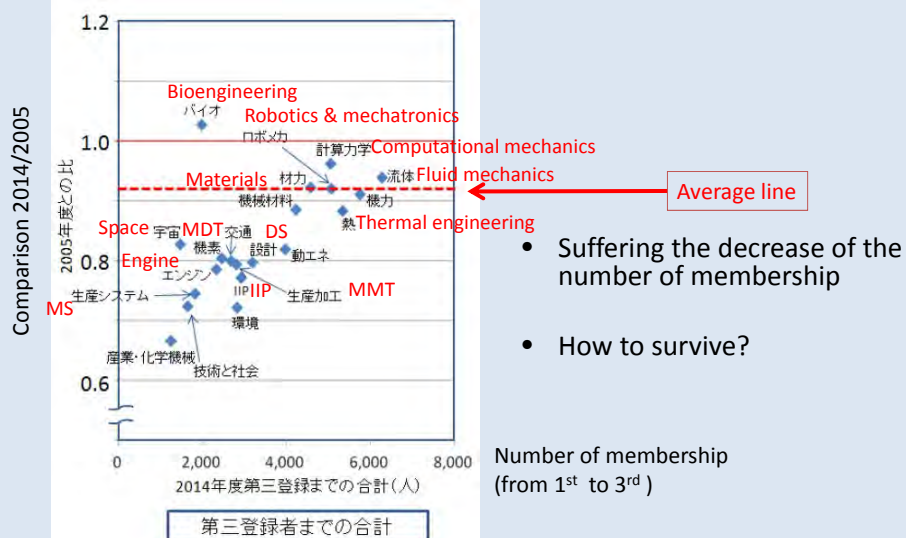
- Q: “What’s precision? Do we study technologies of watches for example?”
- A: “yes and no”
- Q: Ummm...
- One answer that persuaded me:
  - “Precision is a kind of philosophy; it is a *viewpoint*. Precision engineering includes machining, measurement, quality management, control of mechanical systems, design theory, and so on. *It is synthetic, interdisciplinary and cross-sectional.*”  
(translated by myself from my vague memory)

## Statistics – membership of JSME

- Age problem (as of the end of fiscal year 2014)



## Members (year 2014 vs year 2005) of each division



- Suffering the decrease of the number of membership
- How to survive?

## Statistics – membership of IIP

| Fiscal year              | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------------------|------|------|------|------|------|------|
| IIP registration (Total) | 3334 | 3284 | 3214 | 3101 | 3001 | 2926 |
| Industry                 |      |      | 1616 | 1550 | 1479 | 1428 |
| Government               |      |      | 171  | 164  | 155  | 149  |
| Academia                 |      |      | 1049 | 990  | 979  | 979  |
| Others                   |      |      | 378  | 397  | 388  | 370  |




## Statistics – domestic meetings of IIP

|                   | # of sessions | # of papers | # of Invited talks | # of participants | Industry/ Academia/ Others | Date             | Venue                         |
|-------------------|---------------|-------------|--------------------|-------------------|----------------------------|------------------|-------------------------------|
| IIP2008           | 9             | 104         | 0                  | 187               | 49/129/10                  | Mar. 17-18, 2008 | Tokyo Institute of Technology |
| 2009              |               |             |                    |                   |                            |                  |                               |
| IIP2010           | 7             | 66          | 3                  | 128               | 27/100/1                   | Mar. 16-17, 2010 | Tokyo Denki University        |
| IIP2011 cancelled | 7             | * 79        | * 2                | -                 | -                          | Mar. 22-23, 2011 | (Tokyo Denki University)      |
| 2012              |               |             |                    |                   |                            |                  |                               |
| IIP2013           | 10            | 73          | 1                  | 151               | 51/96/4                    | Mar. 21-22, 2013 | Toyo University               |
| IIP2014           | 9             | 77          | 2                  | 132               | 43/88/1                    | Mar. 18-19, 2014 | Toyo University               |
| 2015              |               |             |                    |                   |                            |                  |                               |
| IIP2016           | ?             | 120?        | ?                  | 200?              | ?                          | ?                | ?                             |

- How to achieve the target? => bring one neighbor researcher/engineer/student with you. ;-)

## News: Journals from JSME

Published by JSME: Reorganized in 2014



**Bulletin of the JSME** [日本語]

|  |  |   |  |  |
|--|--|---|--|--|
| <b>Mechanical Engineering Reviews</b>          | <b>Transactions of the JSME (in Japanese)</b>    | <b>Mechanical Engineering Journal</b>                   | <b>Mechanical Engineering Letters</b><br><small>(in preparation)</small> | Accepts submission from July 1st, 2015 |
| <b>Journal of Fluid Science and Technology</b> | <b>Journal of Thermal Science and Technology</b> | <b>Journal of Biomechanical Science and Engineering</b> | <b>Journal of Advanced Mechanical Design, Systems, and Manufacturing</b> |  |

Published by each division


Other journals [published outside]

- ROBOMECH Journal (2014-) [from Springer]
- International Journal of Engine Research (2000-) [from SAGE Publications]

English Journal by IIP and others since 2007

## JAMDSM (Journal of Advanced Mechanical Design, Systems, and Manufacturing)

- Jointly published since 2007 by
  - MDT (Machine Design and Tribology),
  - DS (Design and Systems),
  - MMT (Manufacturing and Machine Tool),
  - MS (Manufacturing Systems) and
  - **IIP**
 divisions.
- In 2014 (vol.8), 6 numbers, 80 papers + 2 prefaces for special issues



## Categories of the new journal: MECHANICAL ENGINEERING JOURNAL

| Categories                                  |              |   |
|---|--------------|---|
| Category                                    | abbreviation | Divisions, Professional Committees and Promotion Committee (Linking to Keyword)   |
| Solid Mechanics and Materials Engineering   | SMM          | <a href="#">Materials &amp; Mechanics</a><br><a href="#">Materials &amp; Processing</a>   |
| Fluids Engineering                          | FE           | <a href="#">Fluids Engineering</a>  |
| Thermal, Engine and Power Engineering       | TEP          | <a href="#">Thermal Engineering</a><br><a href="#">Engine Systems</a><br><a href="#">Power &amp; Energy Systems</a>   |
| Dynamics & Control, Robotics & Mechatronics | DR           | <a href="#">Dynamics, Measurement &amp; Control</a><br><a href="#">Robotics &amp; Mechatronics</a>  |
| Micro / Nano Science and Technology         | MN           | <a href="#">Micro-Nano Science &amp; Technology</a>   |
| Computational Mechanics                     | CM           | <a href="#">Computational Mechanics</a>   |
| Design, Systems, and Manufacturing          | DSM          | <a href="#">Machine Design &amp; Technology</a><br><a href="#">Design &amp; Systems</a><br><a href="#">Manufacturing &amp; Machine Tool</a><br><a href="#">Manufacturing Systems</a><br><a href="#">Information, Intelligence &amp; Precision Equipment</a> |
| Bio, Medical, Sports and Human Engineering  | BMS          | <a href="#">Bioengineering</a><br><a href="#">Sports engineering and Human Dynamic</a><br><a href="#">Biomedical Engineering and Technology</a>   |

Oops !  
No keywords from IIP  
and MDT division !

## A new trial since 2007

- Summer school : a program on engineering education jointly by industry and academia
  - To provide scientific stimuli to students, and
  - To bring mutual understandings between different universities



JSME Education prize 2010

Icebreaking: making straw towers



Panel discussion



Summer school 2014 at Toyo University: 64 participants from 4 universities



## Road Map symposium (Mar. 20, 2015)

- RM from each area within IIP
  - Information equipment
  - Microsystems
  - Micro 3D printer
  - Intelligent Machines
  - Medicine-engineering collaboration
  - Rehabilitation robotics and human-assistance
  - Flexible media handling
- Presented in yesterday's forum in MIPE2015

Compiled by the strong leadership of Professor Saegusa.  
Great thanks to him!



Photograph: courtesy of Prof. Y. Tanaka at NIT

## What should we do?

(again from the Introduction from the JSME-IIP website)

- ...
- However, from the viewpoints of the increasing capacity, the **downsizing** of the information equipments, and **highly intelligence** of the devices, the **micro-nano technologies, micromechatronics, intelligent technologies** of the machines, and **Bio-medical and welfare technologies** have become more important.
- Furthermore, the extension of the research of a basic theory including micro-nano science as the common ground technology is inevitable in high-tech development of the truth.
- **Clarification and application of the new phenomenon not caught with a past frame are treasure houses** of the material for the persons who research and develop them in the enterprise or the university.

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## What should we do for the promising future?

- Continuous exploration to find the next *X equipment*, next target area.
- Possible application areas in manufacturing side from the robotics and automation viewpoint; e.g., sensing and handling issues of flexible object
  - Car industry: e.g. wire harnesses
  - Semiconductor packaging (again)
  - Agriculture and food industry: food handling with inspection
  - Logistics industry: freight distribution
- Industry waits solutions based on the rigid academic background for the breakthrough.



Wire harnesses: copied from yazaki HP  
<http://www.yazaki-na.com/en/product/wire-harness/>

- **Differentiation from other groups !**
- **Industry/academia collaboration !**

## I would like to ask all of you...

- To invite (force(?)) more *researchers, engineers* and *students* to IIP meetings
  - More participants (over 200!) in IIP2016 !
  - More participants in MIPE 2018 ! See you again in USA.
- To widen human network by attending/organizing activities of JSME/ASME/others.
- To publish more papers in JAMDSM journal as well as JSME/ASME journals.