

# NAGANO-UEDA

## Nagano-Ueda Smart Device Cluster

### Outline of the Project

In this project, Shinshu Univ. and the enterprises which have supported regional industries for many years are cooperating. New technologies will be jointly developed to create new products. That means advanced nanotechnology of Shinshu Univ. will be put into practical use.

As a result, it aims at giving a competitive advantage to existing industries, creating new industries, and increasing job opportunities.

### Members of the Headquarters

- President..... KANEKO Hachiro (CEO of Technological Foundation of Nagano Prefecture)
- Project Director..... AKIYAMA Masayuki
- Research Director..... SHIRAI Hirofusa (Prof.Dr.Dean, Faculty of Textile Science and Technology, Shinshu Univ.)
- Vice Research Director..... NOMURA Akio (Prof.Dr.Dean, Faculty of Engineering, Shinshu Univ.)
- Science and Technology Coordinator... MORIMOTO Shingo  
KUBO Juichi

**Central Project Organization**      Technological Foundation of Nagano Prefecture

**Core Institute(s)**                      Faculty of Engineering, Shinshu Univ.  
Faculty of Textile Science and Technology, Shinshu Univ.

**Participants**

Industry...Algol Corporation, Engineeringsystem. Co.,Ltd., Chinontec Industries Inc., Hioki E.E. Corporation, Misuzu Industries Corporation, Nagano Japan Radio Co.,Ltd., Nagano Keiki Co.,Ltd., Nichicon Corporation, Nippon Soda Co.,Ltd., Nissei Plastic Industrial Co.,Ltd., Orion Machinery Co.,Ltd., Sankyo Seiki MFG. Co.,Ltd., Seiko Epson Corporation, Shinano Kenshi Co.,Ltd., S.N.Seiki Co.,Ltd., Tamagawa Seiki Co.,Ltd., Totoku Electric Co.,Ltd., Tsukada Riken Industry Co.,Ltd. (in alphabetical order)

Institute .. Shinshu Univ., Nagano National College of Technology, Chitose Institute of Science and Technology

Government...Industrial Research Institute of Nagano Prefecture, Precision Technology Research Institute of Nagano Prefecture

**Main Researchers**

ENDO Morinobu (Prof.Dr., Dept.of Electrical and Electronic Engineering, Faculty of Engineering, Shinshu Univ.)

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## Outline of Researches

●**Smart Mechanism Device Project** (Research and development of smart mechanism devices for which Nano carbon composites are used)  
Endo fibers and the process of manufacturing are the basis of our research and development. Reformative mechanical components and compound modules with completely new functions will be developed. Thermal conductivity, super-lubricity, high abrasion resistance, high strength, superprecision processing and electroconductivity, etc. are enumerated as such functions.

The following joint researches under seven themes will be conducted, aiming at achieving above-mentioned targets:

- Development and application of Nano compound process.
- Nano interface control and application.
- Providing functionality and application.
- Advanced metal mold technology and application.
- Nano structure evaluation and analytical technology.
- Development of composite metal mold of Grassy carbon and VGCN.
- Research summary.

[ Faculty of Engineering, Shinshu Univ., Nagano National College of Technology, Chinontec Industries Inc., Misuzu Industries Corporation, Nagano Japan Radio Co.,Ltd., Nagano Keiki Co.,Ltd., Nichicon Corporation, Nissei Plastic Industrial Co.,Ltd., Orion Machinery Co.,Ltd., Sankyo Seiki MFG. Co.,Ltd., Seiko Epson Corporation, Shinano Kenshi Co.,Ltd., Tamagawa Seiki Co.,Ltd., Totoku Electric Co.,Ltd., Tsukada Riken Industry Co.,Ltd. (in alphabetical order) ]

●**Smart Information Device Project** (Research and development of smart information devices for which functional Nano polymer materials are used)  
Organic LED element technology will be developed. Development of applied products based on the technology will be enhanced. On the other hand, organic semiconductor laser will be researched and developed as a new optical device, etc.

The following joint researches under seven themes will be advanced, aiming at achieving the above-mentioned targets:

- Design and manufacturing of organic LED materials.
- Structural design of elements which can be modulated at high speed and development of manufacturing technology.
- Development of transparent electrode technology.
- Synthesis and evaluation of laser materials.
- Production of structurally controlled thin film, and development of crystallization manufacturing technology.
- Laser resonator structure, and evaluation.
- Manufacturing laser element structure and evaluation.

[ Faculty of Textile Science and Technology, Shinshu Univ., Chitose Institute of Science and Technology, Algol Corporation, Engineeringsystem.Co.,Ltd., Hioki E.E. Corporation, Nippon Soda Co.,Ltd., Sankyo Seiki MFG. Co.,Ltd., Seiko Epson Corporation, S.N.Seiki Co.,Ltd., Totoku Electric Co.,Ltd. (in alphabetical order) ]

## Expected Results

**Original smart devices with international competitiveness and such commodities will be created.**

- Device field : Superprecision minute cogwheels・Bearing parts, Electromagnetic shield parts, Super-thermal conduction parts, Luminescence displays, Organic semiconductor lasers, etc.
- Processing field : Structural limit analysis measurement, Micromachines, Superprecision metal molds, etc.
- Nano material creation field : Creation of organic materials, Material blend and material reforming of carbon nanotubes, etc.