

Prof. Toru YAO (yao@riken.jp) Jan. 2012

- Advisor, RIKEN Yokohama Research Promotion Division (2008--)
Former Advisor, RIKEN Genomic Sciences Center (1998-2008)
Ex-Member, Research Priority Committee of RIKEN (2004-2006)
- Advisor, Integrated Database, BIRC (Biomed. Info. Res. Center), AIST (2004--)
Ex-Advisor, CBRC (Computational Biology Research Center), AIST (2004-2008)
Ex-Fellow, Center for Research and Development Strategy, JST (2007-2010)
Former Visiting Professor, Tokyo Medical and Dental University (2004-2010)
- Visiting Scientist, Research Institute at SFC, Keio University (1996-2000, 2007--)
Former, Senior Science Advisor, Molecular Simulations Inc. (1992-1998)

I have long been focusing on the analysis and design of chemical processes and chemical products using computer simulations and database analyses as an engineer at Mitsubishi Chemical Corp. (Computational Chemistry and Process Systems Engineering) (1961-1985)

I established the computational protein analysis group as one of the research directors at the Protein Engineering Research Institute (a national project) .

(Computational Protein Design and Protein Informatics) (1986-1991)

I worked as the advisor of Computer Applications in Chemistry and Chemical Engineering at the Central Research Lab. of Mitsubishi Chemical Corporation (1992-1997) , and established the Computational Drug Design Group (1992-1993) .

I worked as the advisor of Computer Applications in Genome and Protein Analysis at the Genomic Science Center of RIKEN and established Bioinformatics groups. (1998--)

I have been promoting Bioinformatics and Systems Biology in Japan with extensive investigations of world-wide movements. (1986--)

I have been involved in many national projects related to Bioinformatics, Computational Biology and Systems Biology. (1986--)

I have much interest with Synthetic Biology and ELSI problem in these years.

I am also interested in the movement of the Open Science in the fields of Frontier Sciences and Global Challenging Problems or Innovations.

I play tennis every week with my neighborhood friends for more than 35 years.

majored in *Applied Physics,*
Systems/Control Engineering
and Information Science

(Stimulated by Norbert Winner's Cybernetics)

at the **University of Tokyo** 1954-1958

joined the **Mitsubishi Chemical Corp.**

a leading chemical company in Japan, in 1958

worked for *the Computer Applications*
to Chemical Products and
Process Developments

for many years.

since 1986

involved in

Bioinformatics for
Protein Engineering
Drug Design
Genome Analysis

promoting (2000--)

Systems Biology

1986--1991 Research Director,
Computational Analysis Group,
Protein Engineering Research Institute
Protein Informatics and Computation

1991--1998 Executive Consultant,
Yokohama Central Research Center,
Mitsubishi Chemical Corp.
*Computer Applications to Drug Development and
Materials Development*

1992—1998 Senior Scientific Advisor,
Molecular Simulations Inc. (Former BIOSYM,
now Accelrys)

1998--2008 Executive Consultant→Advisor,
Bioinformatics and Systems Biology,
Genomic Sciences Center of RIKEN

2004--2006 Member,
Research Priority Committee of RIKEN

2004--- Advisor of CBRC/AIST, METI

2004--- Advisor of JBIRC/JBIC, METI→BIRC/AIST

2007--- Fellow, CRDS, JST

2008--- Advisor, RIKEN GSC (Genome Sciences Research
Complex)

Steering Committee Member

government-funded bioinformatics and computational science initiatives

Atom Technology / JRCAT

Rice Genome → Integrated database

Genome Informatics

Drug Development

Strategic Simulation Software Development

Simulation Program for Cellular and Physiological Processes

Bio-mimetic Process Development

Synthetic Genes of Glycoproteins

Member of Associations to combine Industries and Academia

CBI (Chemistry, Biology and Informatics)

CAMM (Computer-Aided Molecular and Materials Engineering/Design)

ICC (Industrial Computational Chemistry at ASPRONC)

HSF (Genome Drug Discovery WG at the Human Science Foundation)

JBIC (Japan Biotechnology Informatics Consortium)

OmiX (Japan Association for Omics-based Medicine)

Education, Teaching of Bioinformatics

Tokyo Medical and Dental University (2004---)

Keio University at SFC (2007--)

(Former)

Toin Yokohama University (1995---2004)

Gakushuin University (2000---2005)

University of Tokyo (1994,1995, 2000, 2002)

Tokyo Institute of Technology (2000, 2001)

Tokyo Agriculture and Technology Univ. (1997, 2000)

Nagoya City University (2003)

Tokyo Science University (1999)

Keio University at SFC (1995--1998)

Tokyo Technical College (2001--2003)

Omiya Super Science Highschool (2006)

Thanks

Everyone

Anyone

Respect

Everything

Anything

Enable

I play tennis once a week (more than 30 years, 1500 times)

I do have strong curiosity in living systems.

-- Congratulations for Darwin's 200/150 !!

1850 ~	Evolution	Darwin	1859-
1900 ~	Genetics	Mendel	1865-1900-
1950 ~	Central Dogma Molecular Biology	Watson & Crick	1953-
2000 ~	What ?	Who ?	

- 1850 ~ Evolution Darwin 1859-
- 1900 ~ Genetics Mendel 1965-1900-
- 1950 ~ Central Dogma Watson & Crick 1953-
Molecular Biology
- 2000 ~ Genomics
Systems Biology
Synthetic Biology
Others ?

Systems Biology and Synthetic Biology in Japan

Groups, Projects, Developments

Succeeding to the report "Systems Biology in Japan" in BIOforum Europe in February 2005, recent activities of Systems Biology and Synthetic Biology are described and summarized here. The number of research groups that work on Systems Biology is increasing steadily in these years, although not so rapidly compared to the USA and Europe. Thus, Japan is now seeking for a new direction. Concerning Synthetic Biology, several groups are focusing on developments and applications with unique approaches.

There are big movements in the genome/post-genome era. "From Molecular Biology to Systems Biology" [1-3] towards "Synthetic Biology" [4], and Japan has a long history in these fields.

In 1995, M. Itaya proposed the "Genome Engineering" at the Mitsubishi Chemical Life Science Institute; and the "Accelerated Evolutionary Engineering" project, headed by Y. Fushimi, under the NEDO (New Energy and Industrial Technology Development Organization)

started in the same year. In 1996, the E-Cell project was launched at the Tomita Laboratory at Keio University, and the development of the KEGG began at the Kanehisa Laboratory at Kyoto University. Two years later, the Kitano Symbiotic Project was launched as one of the ER-ATO projects of JST (Japan Science and Technology Agency). H. Kitano used the word "Systems Biology" in this project for the first time in the world.

All of these activities have been continuing or expanding until now, and a lot of other projects or research groups in various fields started within a few years, for example the Leading Project for Biosimulation and the Genome Network Project.

Japan played an international role in these fields, and several important meetings had their premieres in Japan: The first ICSB (International Conference on Systems Biology) was held in Tokyo in 2000 and the first RTK (Receptor Tyrosine Kinase) consortium meeting took place at RIKEN Yokohama in 2005. In the same year, the first Annual Meeting of the Metabolomics Society was held in Tsuruoka, and the first PCSB (Future Challenges for Systems Biology) Workshop took place in Tokyo this February.

In December 2004, Japan welcomed a delegation from the USA/WTEC (World Technology Evaluation Center) which conducted a survey on Systems Biology in Japan [5].



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