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Do You Know Nagoya University? (short version)

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URL: <http://www.tb.phys.nagoya-u.ac.jp/index-e.html>

The City of Nagoya



Outline of Nagoya

- Population of 2.32 million
- 1 hr 40 m to Tokyo; 30/50 m to Kyoto/Osaka by SHINKANSEN, or bullet trains

Industry

- Best known as an industrial powerhouse
 - Home of Toyota Motor Corp., Mitsubishi Heavy Ind., etc.



Nagoya Castle



Downtown Nagoya

Nagoya University (名古屋大学)



Toyoda Auditorium,
donated by the Toyota Motor Corporation

Nagoya University Overview

History

1871 Established as a temporary hospital and medical school

1939 Established as **Nagoya Imperial University**

1947 Changed to **Nagoya University**



Main Campus

9 Undergraduate and 13 Graduate Schools

Letters (arts, social
science & humanities)

Economics

Medicine

Education

Information Science

Engineering

Law

Science (mathematics &
natural science)

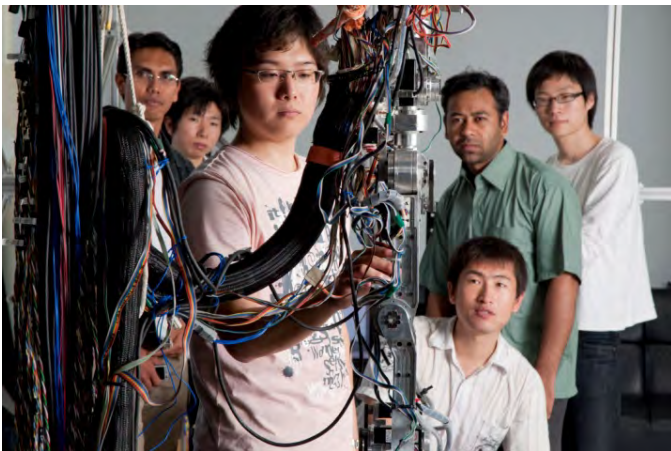
Agricultural Sciences

Total Student Population: 16,536

Undergraduate: 10,115

Graduate: 6,272

International Students: 2,289 (May 1, 2018)



Imperial Universities (帝国大学) — 最高学府

In 1886 Japanese Government has installed the Imperial University System (first modern university system) in order to educate young students in the European manner and aimed to create elite and leaders of the country.

Before that, higher education in Japan meant Chinese Literature education, especially Confucian teaching (孔子).

	Year founded	Imperial University
1	1886	東京 (Tokyo)
2	1897	京都 (Kyoto)
3	1907	東北 (Tohoku)
4	1911	九州 (Kyushu)
5	1918	北海道 (Hokkaido)
6	1924	京城 (Seoul)
7	1928	台北 (Taipei)
8	1931	大阪 (Osaka)
9	1939	名古屋 (Nagoya)

People believe: The older a university is, the more prestigious and better it is.
Is it true?

How Does Media Report? (1)

Thomson Reuter (presently, Clarivate Analytics), Japan gave the following ranking according to the total number of citations and announced in media in April (every year).

Cf. <http://www.thomsonscientific.jp/news/press/esi2007/ranking.html>

Ranking of Japanese Universities Based on Total Numbers of Citations

(1996-2006)

Domestic Ranking	World Ranking	Universities	No. of Faculty Members*
1	13	Univ. of Tokyo	3969
2	30	Kyoto Univ.	3003
3	34	Osaka Univ.	2458
4	70	Tohoku Univ.	2567
5	99	Nagoya Univ.	1804
6	110	JST	
7	119	Kyushu Univ.	2315
8	140	Hokkaido Univ.	2166
9	159	RIKEN	
10	163	Tokyo Inst. Tech.	1225

* No. of faculty members in 2004: <http://www8.cao.go.jp/cstp/siryo/haihu49/siryo2-7.pdf>

However, these numbers do not represent the real ranking of research level; they just imply that the number of faculty members is large (hence, the total numbers of papers and citations are large).

How Does Media Report? (2)

Recent reports by Clarivate Analytics (former Thomson Reuter) are based on the number of highly cited papers and released to media in April every year.

<https://clarivate.jp/news-releases/esi2018>

Ranking of Japanese Universities Based on Numbers of Highly Cited Papers (2007-2017)

Domestic Ranking	No. of Highly Cited Papers	Universities	Number of Faculty Members*
1	1338	Univ. of Tokyo	3895
2	818	Kyoto Univ.	3361
3	544	Osaka Univ.	3242
4	513	Tohoku Univ.	3155
5	399	Nagoya Univ.	2367
6	319	Kyushu Univ.	2431
7	302	Tokyo Inst. Tech.	1038
8	264	Hokkaido Univ.	2412
9	249	Univ. of Tsukuba	1893
10	188	Hiroshima Univ.	1678

* No. of faculty members in 2017: <http://portal.niad.ac.jp/ptrt/h29.html>

Cf. http://www.mext.go.jp/a_menu/kagaku/sokushinhi/1338460.htm

How Does Japanese Government Assess? (1)

In August, 2013, Ministry of Education, Culture, Sports, Science and Technology (MEXT) has announced to give the following universities special funds to promote research activities.

(**研究大学強化促進事業**)

* Annual Budget of 400 Million Yen (4 Universities)

Kyoto Univ., Tohoku Univ., **Nagoya Univ.**, Univ. of Tokyo

* Annual Budget of 300 Million Yen (12 Universities)

Osaka Univ., Kyushu Univ., Tokyo Inst. Tech., Univ. of Tsukuba, Hiroshima Univ., Tokyo Medical Dental Univ., Tokyo Univ. of Electro Commun., Nara Inst. Adv. Sci. Tech., Waseda Univ., NINS, KEK, ROIS

* Annual Budget of 200 Million Yen (6 Universities)

Hokkaido Univ., Kobe Univ., Toyohashi Inst. Tech., Okayama Univ., Kumamoto Univ., Keio Univ.

Cf. http://www.mext.go.jp/b_menu/houdou/31/09/1420901.htm

How Does Japanese Government Assess? (2)

MEXT chose the following universities as

Designated National Universities (指定国立大学法人)

that should perform education and research at the highest international level:

Academic Year 2017:

Tohoku Univ., Univ. of Tokyo, Kyoto Univ.,
Tokyo Inst. Tech., **Nagoya Univ.**

Academic Year 2018:

Osaka Univ.

Academic Year 2019:

Hitotsubashi Univ.

How Do International Agencies Evaluate?

Academic Ranking of World Universities 2017

<http://www.shanghairanking.com>

World Ranking of Universities

Nagoya University is ranked No. 84 in the World and No. 3 in Japan.

World Ranking	Universities	World Ranking	Universities (Domestic)
1	Harvard Univ.	24	Univ. of Tokyo
2	Stanford Univ.	35	Kyoto Univ.
3	Univ. of Cambridge	84	Nagoya Univ.
4	MIT	101–150	Osaka Univ.
5	UC Berkeley	101–150	Tohoku Univ.
6	Princeton Univ.	151–200	Hokkaido Univ.
7	Univ. of Oxford	151–200	Tokyo Inst. Tech.
8	Columbia Univ.	201–300	Kyushu Univ.
9	California Inst. of Technology	201–300	Univ. of Tsukuba
10	Univ. of Chicago	301–400	Chiba Univ.
11	Yale Univ.		
12	UCLA		
13	Univ. of Washington		
14	Cornell Univ.		

Academic Ranking of World Universities 2017

<http://www.shanghairanking.com>

World Ranking of Universities in Physics

<http://www.shanghairanking.com/Shanghairanking-Subject-Rankings/physics.html>

Nagoya University is ranked No. 17 in the World and No. 2 in Japan.

World Ranking	Universities	World Ranking	Universities
1	MIT	17	Nagoya Univ.
2	UC Berkeley	18	Univ. of Cambridge
3	Univ. of Tokyo	19	Univ. of Oxford
4	Univ. of Chicago	20	Univ. libre de Bruxelles
5	Harvard Univ.	21	Columbia Univ.
6	Princeton Univ.	22	UC Irvine
7	Stanford Univ.	23	Univ. of Munich
8	California Inst. of Technology	24	Kyoto Univ.
9	UC Santa Barbara	25	Johns Hopkins Univ.
10	Univ. of Colorado at Boulder	26	Univ. of Maryland
11	Univ. of Manchester	27	Univ. Paris Diderot
12	Univ. of Paris–Sud	28	Univ. Grenoble Alpes
13	Pierre and Marie Curie Univ.	29	Sapienza Univ. of Rome
14	Univ. of Edinburgh	29	Univ. of Pennsylvania
15	Cornell Univ.	31	Imperial College of Science, Tech. Medicine
16	U. of Illinois at Urbana–Champaign		

Japan has only 23 Nobel Laureates in Science and
3 Fields Medalists

Our Professors (for the **works done at Nagoya Univ.**)

- * **Shigefumi MORI** (1990 **Fields Medal**: “for Minimal Model Program in connection with the classification problems of algebraic varieties of dimension three”)
- * **Ryoji NOYORI** (2001 **Nobel Prize in Chemistry**: “for work on chirally catalysed hydrogenation reactions“)
- * **Isamu AKASAKI** (2014 **Nobel Prize in Physics**: “for the invention of Blue Light Emitting Diode”)

As far as I know, **Nagoya University** is the **only university in Asia** where the prize-winning works for both Nobel Prize and Fields Medal were performed.



Japan has only 23 Nobel Laureates in Science and 3 Fields Medalists

Our Former Students (and Professors)

- * **Osamu SHIMOMURA** (2008 **Nobel Prize in Chemistry**: "for the discovery of the green fluorescent protein, **GFP** ")
- * **Makoto KOBAYASHI** (2008 **Nobel Prize in Physics**: "for the discovery of the origin of the broken symmetry which predicts the existence of at least three families of quarks in nature")
- * **Toshihide MASKAWA** (2008 **Nobel Prize in Physics**: "for the discovery of the origin of the broken symmetry which predicts the existence of at least three families of quarks in nature")
- * **Hiroshi AMANO** (2014 **Nobel Prize in Physics**: "for the invention of Blue Light Emitting Diode")





← Newton's Apple Tree in Cambridge

Newton's Apple Tree → in Nagoya University

In 1964, a descendant of Newton's Apple Tree was sent to Professor Yuji Shibata, the director of Japan Academy and the first Dean (1942-1948) of School of Science, Nagoya University. It has been nursed at Koishikawa Botanical Garden in Tokyo and came to Nagoya to celebrate the Nobel Prizes of two alumni of the School 47 years later.



小林 誠 博士 益川 敏英 博士
 2008年ノーベル物理学賞受賞記念
 「ニュートンのリンゴの木」
 2011年10月25日
 Dr. Makoto Kobayashi Dr. Toshitake Maskawa
 In celebration of winning of the Nobel Prize in Physics 2008
 "Newton's Apple Trees"
 October 25, 2011

2008年ノーベル物理学賞記念植樹
 物理学部卒業生である、益川敏英、小林誠の両博士が、2008年ノーベル物理学賞を受賞されたことにより、10月25日に記念植樹が行われました。この「ニュートンのリンゴの木」は、物理学部で長年栽培されているニュートンのリンゴの木の子孫です。2011年10月25日、物理学部で長年栽培されているニュートンのリンゴの木の子孫が、益川敏英、小林誠の両博士のノーベル物理学賞受賞を記念して、物理学部で記念植樹が行われました。この「ニュートンのリンゴの木」は、物理学部で長年栽培されているニュートンのリンゴの木の子孫です。2011年10月25日、物理学部で長年栽培されているニュートンのリンゴの木の子孫が、益川敏英、小林誠の両博士のノーベル物理学賞受賞を記念して、物理学部で記念植樹が行われました。この「ニュートンのリンゴの木」は、物理学部で長年栽培されているニュートンのリンゴの木の子孫です。
 -Planting to commemorate 2008 Nobel Prize in Physics-
 Professor Makawa and Kobayashi are the first laureates of physics in 2008. They were the students of the Graduate School of Science, Nagoya University. To commemorate the achievement, Newton's Apple Tree is planted to them on October 25, 2011. This tree is the great pleasure that nurtured the students physics. It is given by those who engaged the establishment of the Graduate school of physics.
 In 1964, a descendant of Newton's Apple Tree was sent to Professor Yuji Shibata, the Director of Japan Academy, and the first dean of our school (1942-1948). It has been nursed at Koishikawa Botanical Garden, and comes to Nagoya to celebrate the Nobel Prize of two alumni of the School 47 years later.

Newton's Apple Tree in Nagoya University: 4 July, 2018



Our Library bought a second (1713) edition of Newton's PRINCIPIA

特別展示 ニュートン著「プリンキピア」第2版(1713年出版)

2012
10/18(木)~25(木) 名古屋大学E S総合館2階 2008 ノーベル賞展示室

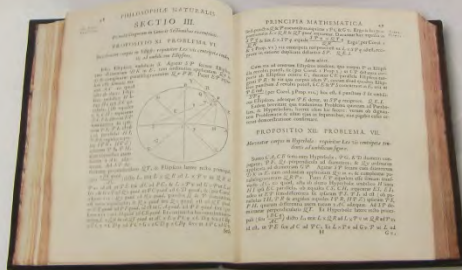


アイザック・ニュートン
1643年~1727年

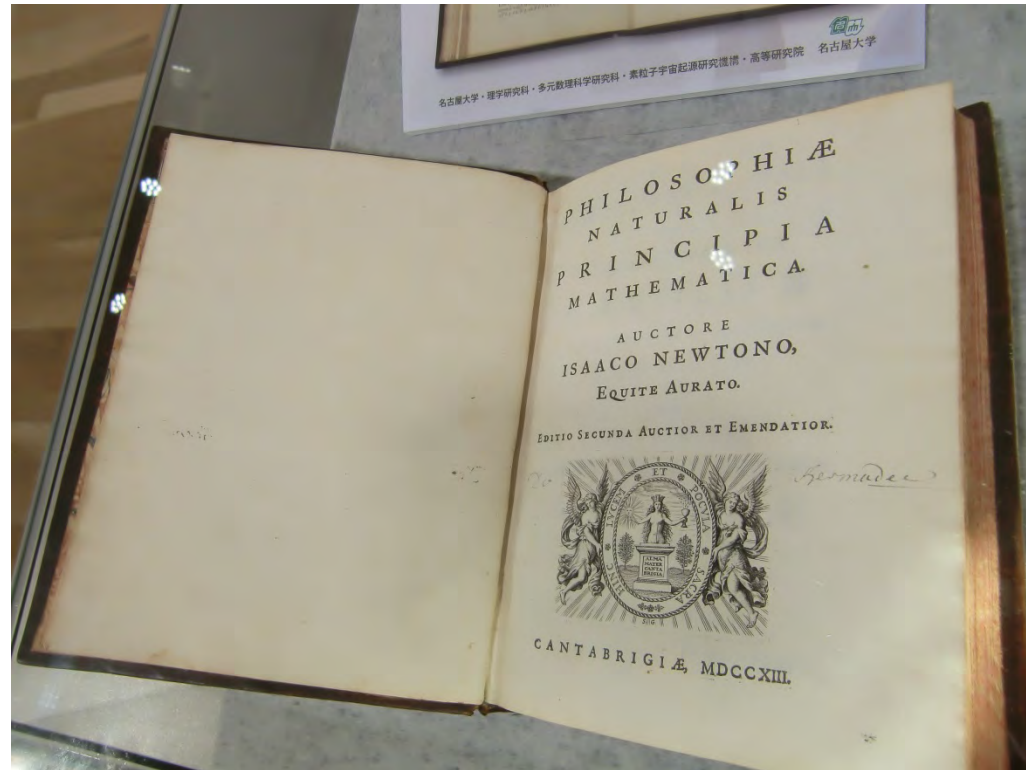
「自然哲学の数学的諸原理」(ラテン語原題 Philosophiæ Naturalis Principia Mathematica)は、「プリンキピア」(Principia)という略称でよく知られており、1687年に初版全3巻が出版された。初版に対し、第2版では、第2章、第7章等が改訂されたほか、「一般的注解」が末尾に付け加えられた。

下の写真は第3章(SECTIO III)「円錐曲線上の物体の運動」の冒頭部分

命題11、問題6:「物体が楕円上を運動している場合、楕円の焦点に向かう中心力の法則を求めよ」
楕円の焦点からの中心力を受けて楕円上を回っている物体に働いている力は、距離の2乗に反比例することを示している。これは、惑星が太陽を焦点とする楕円軌道上を運動している場合、重力が太陽と惑星間の距離の2乗に反比例することを証明している。



名古屋大学・理学研究科・多元数理科学研究科・素粒子宇宙起源研究機構・高等研究院 名古屋大学



No. of Nobel Laureates for Science from Japan (No. of Fields Medalists)

	Univ. where prize-winning works done	Degree granting univ.	Univ. when awarded
Kyoto Univ	5 [Fukui, Kobayashi, Maskawa, Yamanaka, Honjo]	8 (2) [Yukawa, Tomonaga, Fukui, Tonegawa, Noyori, Akasaki, Honjo, Yoshino (Hironaka, Mori)]	3 (1) [Fukui, Yamanaka, Honjo (Mori)]
Nagoya Univ.	3 (1) [Noyori, Akasaki, Amano (Mori)]	5 [Kobayashi, Maskawa, Shimomura, Akasaki, Amano]	2 [Noyori, Amano]
Univ. of Tokyo	3 [Koshiba, Kajita, Ohsumi]	8 (1) [Tomonaga, Esaki, Koshiba, Nanbu, Negishi, Omura, Kajita, Ohsumi (Kodaira)]	1 [Kajita]
Osaka Univ.	1 [Yukawa]	2 [Yukawa, Yoshino]	0
Tokyo Inst. Tech.	1 [Shirakawa]	1 [Shirakawa]	1 [Ohsumi]
Hokkaido Univ.	1 [Suzuki]	1 [Suzuki]	0
Univ. of Tsukuba	1 [Tomonaga]	0	1 [Tomonaga]
Kitasato Univ.	1 [Omura]	0	1 [Omura]
Nara Inst. Sci. Tech.	1 [Yamanaka]	0	0
Natl Inst. Basic Biol.	1 [Ohsumi]	0	0
Tohoku Univ.	0	1 [Tanaka]	0
Nagasaki Univ.	0	1 [Shimomura]	0
Kobe Univ.	0	1 [Yamanaka]	0
Osaka City Univ.	0	1 [Yamanaka]	0
Tokushima Univ.	0	1 [Nakamura]	0
Tokyo Univ. of Sci.	0	1 [Omura]	0
Yamanashi Univ.	0	1 [Omura]	0
Saitama Univ.	0	1 [Kajita]	0
Meijo Univ.	0	0	2 [Akasaki, Yoshino]
Kyoto Sangyo Univ.	0	0	1 [Maskawa]

Some of Outstanding Former Students and Professors of Physics Department at Nagoya University

<https://www.phys.nagoya-u.ac.jp/en/study/ach.html>

1. Particle Physics

* Shoichi SAKATA

has proposed the "Sakata Model", a forerunner of the quark model, and has discovered the "Maki-Nakagawa-Sakata Matrix", which has predicted neutrino oscillations.



* Makoto KOBAYASHI and Toshihide MASKAWA

have discovered the "Kobayashi-Maskawa Matrix", which predicted the existence of a third generation of quarks and explained the mechanism for CP violation.



* Kimio NIWA

has developed a full-automatic nuclear emulsion read-out system and has discovered the tau neutrino.

Some of Outstanding Former Students and Professors of Physics Department at Nagoya University

<https://www.phys.nagoya-u.ac.jp/en/study/ach.html>

2. Astrophysics and General Relativity

* Satio HAYAKAWA

has started space astronomy research in Japan with X-ray and infrared observations, including the first rocket observation of cosmic X-rays.

* Yasuo TANAKA

has led Japanese X-ray astronomy research to the first class in the world with many X-ray missions.

* Akira TOMIMATSU

has discovered the "Tomimatsu-Sato Solution", which is one of the exact solutions to the Einstein Equation in the General Theory of Relativity.



Some of Outstanding Former Students and Professors of
Physics Department at Nagoya University

<https://www.phys.nagoya-u.ac.jp/en/study/ach.html>

3. Condensed Matter Physics

* **Ryozi UYEDA**

has pioneered in the world the development of a reflection high-energy electron diffraction device featuring a vacuum evaporator and has also become a pioneer in Japan's nanoscience research with his works on superfine particles.



* **Tadao KASUYA** and **Kei YOSIDA**

have discovered the "Ruderman-Kittel-Kasuya-Yosida (RKKY) Interaction", which is a long-distance interaction between localized spins existing in different sites of metal.



* **Huzio NAKANO**

has discovered the "Nakano-Green-Kubo Formula" for electric conductivity, which is one of the bases for non-equilibrium statistical mechanics.



Some of Outstanding Former Students and Professors of Physics Department at Nagoya University

<https://www.phys.nagoya-u.ac.jp/en/study/ach.html>

4. Biophysics

* **Fumio OOSAWA**

has discovered the "Asakura-Oosawa Theory" on depletion forces, has started biophysics research in Japan, and has played a major role in the inauguration of the Biophysical Society of Japan.



* **Sho ASAKURA**

has discovered the "Asakura-Oosawa Theory" on depletion forces and has also succeeded in in-vitro reconstruction of bacterial flagella, elucidating the mechanism of flagella formation.



Employment Rates of Former Imperial University Students

*大学別実就職率(2018年卒) [Employment rate (2018 grads)]

- | | | |
|------------------------|--------|---------------------|
| 1. Nagoya University | 91.9 % | |
| 2. Osaka University | 85.2 | |
| 3. Tohoku University | 84.2 | |
| 4. Hokkaido University | 82.4 | |
| 5. Kyushu University | 81.3 | (「本当に就職に強い大学ランキング」) |
| 6. Kyoto University | 78.0 | 東洋経済(2018年) |

(Data not available for University of Tokyo at the time of publication)

*有名企業400社への実就職率(2017年卒)

[Employment rate for 400 famous companies (2017 grads)]

- | | | |
|------------------------|--------|-----------------------|
| 1. Osaka University | 35.5 % | |
| 2. Nagoya University | 34.3 | |
| 3. Kyoto University | 32.4 | |
| 4. University of Tokyo | 28.2 | |
| 5. Kyushu University | 27.0 | |
| 6. Tohoku University | 24.7 | |
| 7. Hokkaido University | 23.8 | (東洋経済ONLINE2017年9月8日) |

Nagoya University Global 30 International Programs

<http://admissions.g30.nagoya-u.ac.jp/en/>

With these new **undergraduate** and **graduate** programs, we give lectures all in **English** and accept students from abroad.

One of the most attractive and successful international programs in Japan.



G30 Undergraduate Programs

Automotive Engineering

- School of Engineering (Mech/Elec)

Chemistry

- School of Science
- School of Engineering

Biological Sciences

- School of Science
- School of Agricultural Science

Fundamental (and Applied) Physics

- School of Science
- (School of Engineering)

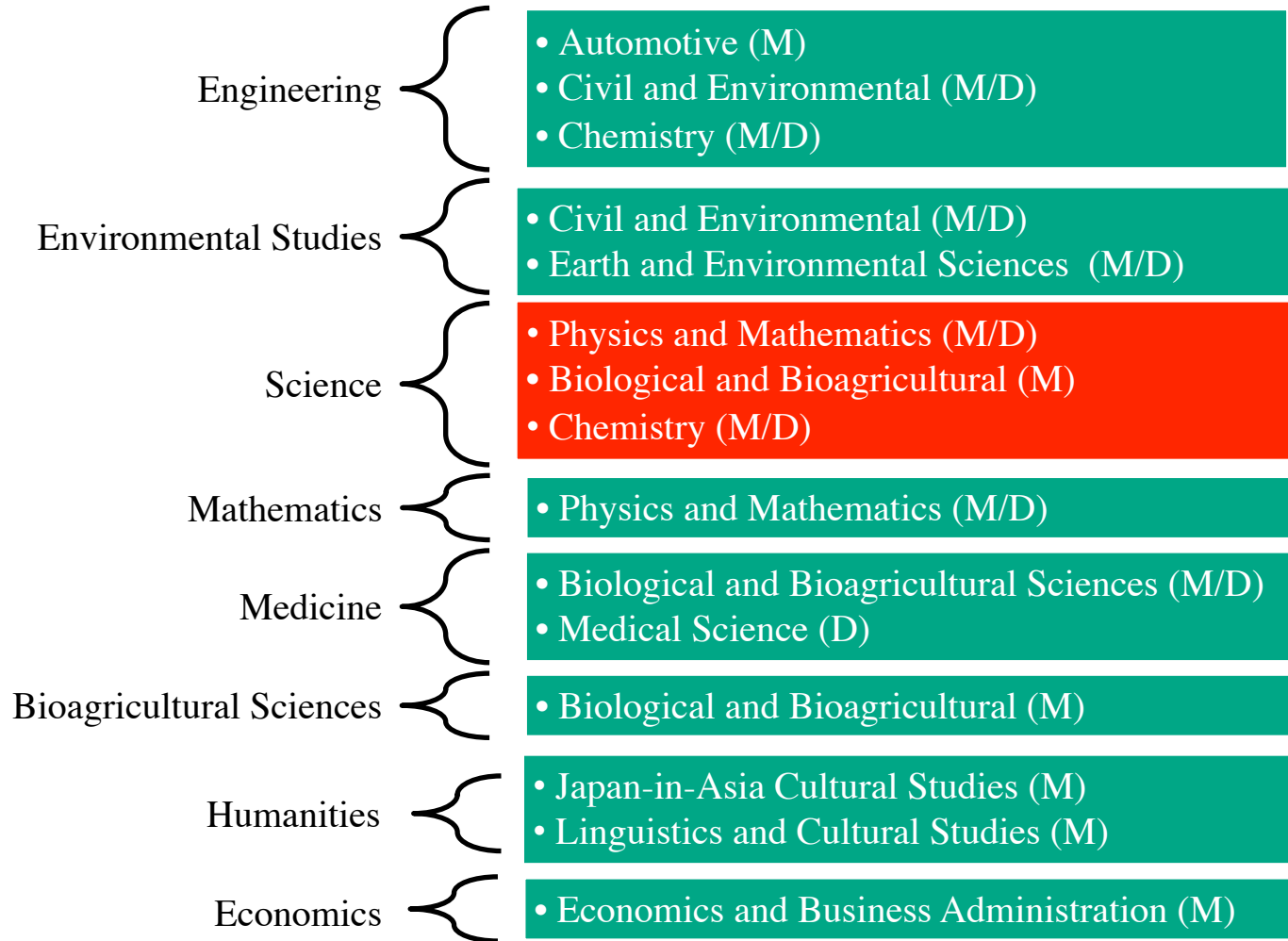
Social Sciences

- School of Law
- School of Economics

Japan-in-Asia Cultural Studies

- School of Humanities

G30 Graduate Programs



Nagoya University Global 30 International Programs

<http://admissions.g30.nagoya-u.ac.jp/en/>

One of the most attractive and successful international programs in Japan.

Our G30 program is attractive because we cover many different subjects/fields.

Our G30 program is successful; e.g., our undergraduate students are getting in graduate schools in top universities in the World such as University of Cambridge, University of Oxford, MIT, University of California at Berkeley, etc.

Nagoya University is doing well not only in academia but also in other fields.

Olympian: **Ayuko SUZUKI** (graduated in 2014; economics)

2013: Gold Medal in Women's 10000 m run and Bronze Medal in Women's 5000 m run in **Summer Universiade in Russia**

2016: Represented Japan for Women's 5000 m and 10000 m runs in **Rio de Janeiro Summer Olympics** (the **first woman Olympian** among the alumni of former imperial universities)

2020: Representing Japan for Women's marathon in **Tokyo Summer Olympics** (which was postponed to 2021)



Nagoya University is doing well
not only in academia but also in other fields.

Professional Japanese Chess (SHOGI) Player: **Sota FUJII** (was a
2nd year student at **Nagoya University Junior High School** when he
became professional)

Oct. 1, 2016: Became professional at the age of 14 years and 2 months old
(the **youngest record**; the previous record was 14
years and 7 months old recorded 62 years before)

June 26, 2017: 29 consecutive wins (7.9 M views
on live net TV) from the beginning of his
professional career (**new record**; the previous
record of consecutive victories was 28 in 1986-87.
He finally lost on July 2, 2017.)

July 16, 2020: Youngest major title holder

(17 years and 11 months old; the previous record was 18 years and 6 months old
recorded 30 years before) [Cf. There are 8 major titles.]

