

BIOGRAPHY

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Prof. Jacques MARESCAUX

MD, FACS, Hon. FRCS, Hon. FASA, Hon. FJSES, Hon. FJSS

Specialty: Minimally Invasive Surgery



Jacques Marescaux was born on August 4, 1948, as the eldest in a family of academics and servicemen. His father was a histology Professor at Strasbourg's school of medicine and his grandfather was a major-general.

After successfully completing his secondary studies, he registered at Strasbourg's school of medicine and quickly discovered his vocation, as shown by his first five years of studying during which he came first at each ranking exam.

In 1971, he came first at the Residency program's examinations, which allowed him to choose his training ship. The different semesters of the residency allowed him to discover the joys of gynecology, the strictness of orthopedic surgery, the subtleties of cardiovascular surgery and the diversity of visceral surgery, a field that he would finally choose.

It quickly became obvious to him that surgery could not be isolated either from its scientific context or from its applied clinical research. This is why he quickly joined an INSERM (French Health and Medical Research National Institute) team dedicated to digestive pathologies.

This scientific cooperation allowed him to be promoted as chief resident in 1975, University Professor for Digestive Surgery in 1980, and then head of department in 1989.

He quickly tied his **first links with the industrials**, not only attracted by the financial means they bring, but mostly because of their underlying values needed for the development of medical research: efficiency, rigor, and a respect for ethics.

In 1992, he came up with the idea of creating an original center for research and training in partnership with leaders of the surgical industry. This would allow him to:

- Develop research using different criteria for excellence from national institutes, as these uniformly implement rules adapted to the main disciplines, but miles away from real clinical issues
- Start the future technological revolutions in the field of surgery, and not to fall behind them
- Integrate new means of telecommunication, as this has become a great challenge on a cultural, political and global scale. He is convinced that surgeons should not only participate to this new information era, but mostly be its best ambassador.

These ideas came to life with the **inauguration of the IRCAD** (Research Institute Against Digestive Cancer) and of its **training in minimally invasive surgery** department in **June 1994**. In this center, researchers, IT technicians, robot engineers and internationally renowned surgical experts would congregate.

Virtual reality is one of the Institute's most important axes. It translates real data into digital data, thus allowing to turn a medical scan into a virtual 3D clone of the patient. The surgeon can then prepare the procedure on the patient's virtual clone, as these simulations are becoming increasingly realistic. During the intervention, the superimposition of virtual data on real data (Augmented Reality) permits a transparent view that should soon allow for the automation of complex surgical movements (JAMA 2007;287:1938-1939). This automation will only be possible by developing the field of surgical robotics, another domain in which the IRCAD has largely demonstrated its excellence.

Since 1994, the IRCAD has participated in numerous projects aiming at optimizing the use of robots. The surgical procedure carried out in 2001 from New York on a patient in Strasbourg (**Operation Lindbergh**), is a spectacular piece of evidence for this, as it demonstrates for the first time that there are no geographical constraints to performing a surgical intervention (**Nature 2001;413:379-380 - Annals of Surgery 2002;235:487-492**), even if the American Army claimed two months before that it was not feasible.

The main objective of the IRCAD is to develop less invasive surgery. Therefore, a new concept was started in 2004 with the project ANUBIS. It is called "transluminal surgery through natural orifices", a technique which leaves no cutaneous or muscular scars. This project, certified by the competitiveness pole for therapeutic innovations, allowed for the development of new surgical instruments and authorized the IRCAD team to perform the **first surgical intervention through natural orifices** on April 2, 2007 (**Archives of Surgery 2007;142:823-826**).

Such a great number of surgical developments required the parallel **development of a training department**. The IRCAD minimally-invasive surgery training department occupies a privileged position in surgical training. Since its creation, it has acquired an international reputation for excellence, as demonstrated by the number of surgeons registering for the training courses. Indeed, **each year, more than 6000 surgeons from all over the world come over to the IRCAD to train**. This would not be possible without the availability and talent of an international faculty of 800 experts. The courses involve digestive surgery, urological surgery, vascular surgery, orthopedic surgery and gynecological surgery. Each session combines theory with live surgeries and hands-on practice on animals in an experimental laboratory. The IRCAD ensures that surgeons from the world over acquire high-standard skills, and **asserts its role as an ambassador of French excellence to the world**.

In 2021, IRCAD has opened a **new 2,200 sq.m. building dedicated to teaching and research in surgical robotics** in order to position itself as the reference center in the field of surgical robotics worldwide. This building entails a robotics platform, including experimental operating rooms, and a 250-seat auditorium equipped with the latest 4K/3D audiovisual technologies.

The quality of this training is certified by **international accreditations**: European Accreditation Council for Continuing Medical Education - EACCME, American Medical Association - AMA, World Endoscopy Organization - WEO.

In 2000, the IRCAD implemented a **Virtual online University, WeBSurg**, resulting from the need to maintain the link between the training center and the surgeons. This website features contents elaborated exclusively by healthcare professionals. These contents are peer-reviewed and accredited by the most prestigious International Scientific Societies.

WeBSurg encapsulates high-quality technology with high-speed multimedia communication systems to broadcast pre-recorded surgical interventions, the respect for cultural and linguistic diversity - the website is available in 6 different languages: French, English, Spanish, Portuguese, Japanese, and Chinese -, and charge-free access, which is of great importance, especially in developing countries. WeBSurg is the true implementation of the future's Virtual University in the field of minimal access surgery. It is particularly well-suited to surgical education, as it allows international surgeons, whatever the specialty, to share their expertise and know-how among themselves. At present, **WeBSurg has over 430,000 members** regularly logging on to the website.

Based on the success of the IRCAD concept, Jacques Marescaux decided to create an **IRCAD subsidiary in Taiwan** in 2008. The IRCAD Taiwan has already trained more than 7,000 Asian surgeons. In the same spirit, another **mirror center opened in the State of São Paulo (Brazil) in July 2011** and another center was inaugurated **in Rio de Janeiro in June 2017**. The two Brazilian centers have already trained nearly 13,000 surgeons since 2011. After the opening of a new IRCAD in **Beirut (Lebanon)** in autumn 2019, a fifth mirror institute will open in **Kigali (Rwanda)** to train surgeons from across the African continent in 2021. A new international implantation of the IRCAD is planned for 2022 in **Wuxi, a city close to Shanghai (China)**, in the heart of a gigantic complex of 4 hospitals specifically dedicated to minimally invasive surgery. In addition, discussions are currently underway for the creation of a mirror institute in the United States and in India.

Professor Marescaux's teaching hospital experience and background, as well as the genuine and beneficial links he had set with the Industry, made it possible for him to be appointed President of the **Alsace Region's International Therapeutic Innovation Pole** from 2005 to 2007.

The spur he brought consisted in counter-balancing the idea of health expenditure control by prioritizing research and innovation. Instead of considering the escalation of health expenditures as a preoccupying ongoing process, he believed it had to be identified as an opportunity for development, competition and innovation, hence creating new jobs and encouraging economic growth.

Such an evolution requires cultural change, which leads to the creation of bioclusters developing diverse methods committed to the future of the field, biotechnologies, nanotechnologies, imaging studies, robotics and computer-aided systems, as the only way of bridging the large technological gap between Europe and the United States of America, Japan, and soon, China.

In the same spirit, Professor Marescaux has initiated a **Biocluster project** within the IRCAD's compounds. It hosts, since January 2014, a score of 20 start-up companies in the area of medical devices (National Stud Farm Project).

Concomitantly, Professor Marescaux came up with a new concept: the **University Hospital Institute**. The objective is to create an **Institute for Image-Guided Minimally Invasive Surgery** aimed at developing a new surgical discipline combining the skills and know-how of laparoscopic surgeons, gastroenterologists and interventional radiologists. This project, which tied first place in the "Investissement d'Avenir" ranking put together by an International Jury in April 2011, represents a 227.3 million Euro budget, financed by the French Grand Loan. Since 2016, a new 12,000 sq m building located between the IRCAD and the Nouvel Hôpital Civil accommodates a unique and new kind of platform for patients: 7 hybrid surgical units dedicated to digestive surgery which incorporate medical imaging (MRI/CT-scan) to a surgical environment.

Besides, Jacques Marescaux and his team have successfully published within 27 years **4,800 national and international articles**, some of them in such prestigious journals as Nature, Nature Science, Annals of Surgery, Archives of Surgery and the New England Journal of Medicine.

Jacques Marescaux has also been invited to deliver more than 450 speeches in many European, American, Japanese, and Chinese Universities or Schools of Medicine, amongst which the **"Address to Diplomates" he gave at the Royal College of Surgeons in London**, the **Nobel Lecture he gave in Stockholm**, and the **Fogarty Lecture he gave at Stanford University**. He also presented a conference entitled **"The Anatomic Lesson"** at the Amsterdam Medical Center as well as the **Antoni de Gimbernat Lecture "New technologies in minimally invasive surgery" at the "XIX Jornades de Cirurgia Als Hospitals de Catalunya"** in Barcelona.

« TOP TEN » PUBLICATIONS

1. D'Agostino J., Diana M., Soler L., Vix M., **Marescaux J.** 3D virtual neck exploration prior to parathyroidectomy. **N Engl J Med** 2012;367:1072-73.
2. Ignat M., Aprahamian M., Lindner V., Altmeyer A., Perretta S., Dallemagne B., Mutter D., **Marescaux J.** Feasibility and reliability of pancreatic cancer staging using fiberoptic confocal fluorescence microscopy in rat. **Gastroenterology** 2009;137:1584-92.
3. Dallemagne B., Perretta S., Allemann P., Asakuma M., **Marescaux J.** Transgastric cholecystectomy in human beings: adapting standard instruments to new challenges. **Br J Surg** 2009;96:1162-1166
4. Compe E., Malerba M., Soler L., **Marescaux J.**, Borrelli E., Egly JM. Neurological defects in trichothiodystrophy reveal a coactivator function of TFIIH. **Nature Neuroscience** 2007;10:1414-1422.
5. **Marescaux J.**, Dallemagne B., Perretta S., Wattiez A., Mutter D., Coumaros D. Surgery without scars: report of transluminal cholecystectomy in a human being. **Arch Surg** 2007;142:823-827.
6. Rubino F., Forgione A., Cummings D.E., Vix M., Gnuli D., Mingrone G., Castagneto M., **Marescaux J.** The mechanism of diabetes control after gastrointestinal bypass surgery reveals a role of the proximal small intestine in the pathophysiology of type 2 diabetes. **Ann Surg** 2006;244:741-9.
7. **Marescaux J.**, Rubino F., Leroy J. Laparoscopic left colectomy and obese patients. **Ann Surg** 2005;242:748.
8. **Marescaux J.**, Rubino F., Arenas M., Mutter D., Soler L. Augmented reality-assisted laparoscopic adrenalectomy. **JAMA** 2004;18:2214-2215.
9. **Marescaux J.**, Rubino F., Leroy J., Henri M. Laparoscopic assisted surgery for colon cancer. **JAMA** 2002;287:1938-9.
10. **Marescaux J.**, Leroy J., Gagner M., Rubino F., Mutter D., Vix M., Butner S.E., Smith M.K. Transatlantic robot-assisted telesurgery. **Nature** 2001;413:379-380.

« TOP » INVITED CONFERENCES

1. Next step in minimally invasive surgery: Hybrid image-guided surgery. **45th Annual Meeting of the American Pediatric Surgical Association (APSA), Phoenix (USA), 29 May 2014.**
2. Chirurgie du futur guidée par l'image numérique. **Chaire d'Informatique et Sciences Numériques. Collège de France, Paris (France), 29 avril 2014.**
3. Innovation et chirurgie : l'invention de l'avenir ou « comment l'imagination devrait donner des ailes à nos pensées. **1^{er} Forum Médical Franco-Brésilien de la Fondation de l'Académie de Médecine, Rio de Janeiro (Brésil), 25 avril 2014.**
4. MIS and computer sciences: Inventing the future. **International College of Surgeons, Taipei (Taiwan), 9th November 2013.**
5. Martin Allgöwer Lecture - Surgery and computer sciences: Inventing the future. **International Surgical Week 2013, Helsinki (Finland), 26th August 2013.**
6. Image-guided hybrid minimally invasive surgery: The next revolution. **113th Annual Congress of the Japan Surgical Society, Fukuoka (Japan), 11th April 2013.**
7. State of the art: The perspectives of implemented, virtual images in surgery. **4th Worldwide Congress of the Clinical Robotic Surgery Association, Chicago (USA), 28th September 2012.**
8. Next steps in MIS: Image guided surgery. **XI Brazilian Videosurgery Society Congress, Rio de Janeiro (Brazil), 19th July 2012.**
9. Conférence Inaugurale - Technologies de l'information et chirurgie - **Cérémonie des 10 ans de l'Académie des Technologies, Paris (France), 18 avril 2011.**
10. IRCAD: A model of integrated surgical research and education. **Japan DDW, Kyoto (Japan), 17 October 2009.**
11. New technologies in minimally invasive surgery. **Antoni de Gimbernat Lecture. XIX Jornades de Cirurgia Als Hospitals de Catalunya, Barcelona (Spain), 02 October 2008.**
12. Surgery and computer sciences: inventing the future, **Thomas Forgarty Lecture. Stanford University, Stanford (USA), 17 October 2008.**
13. Information age and surgery. **Nobel Lecture, Stockholm (Sweden), 08 March 2007.**
14. Address to Diplomates. **Royal College of Surgeons of England, London (United Kingdom), 12 July 2006.**
15. Present and future advances in surgical technologies and surgical education. **SSAT Congress, Los Angeles (USA), 22 May 2006.**

16. The anatomic lesson. **Amsterdam Medical Center, Amsterdam** (*Netherlands*), 01 December 2005.

17. Surgery in the 21st century. **104th Annual Congress of Japan Surgical Society, Osaka** (*Japan*), 09 April 2004.

18. Image guided hepatic surgery. **Congress of the American College of Surgeons, San Francisco** (*USA*), 09 October 2002.

19. The future role of virtual reality and telerobotics in hepatobiliary and pancreatic surgery. **The Society of Surgery of the Alimentary Tract (SSAT), San Francisco** (*USA*), 19 May 2002.