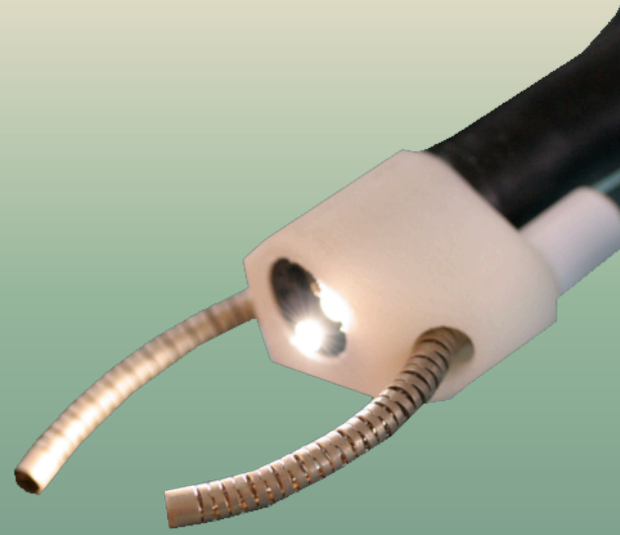
Information Sciences and Technology for Healthcare | HealthTech

The **Interdisciplinary thematic** institutes of the **University** of Strasbourg & cnrs & Inserm funded under the **Excellence Initiative** program



HealthTech
Graduate School Presentation

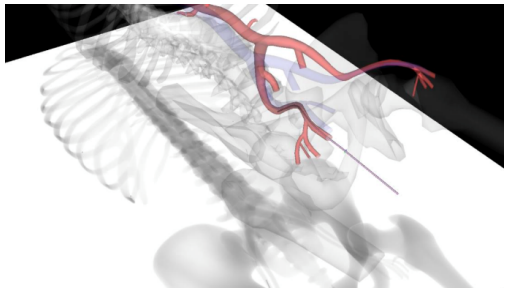
Bernard Bayle HealthTech Project Coordinator
Florent Nageotte HealthTech Master track Coordinator

École d'ingénieurs Master IRIV
Télécom Physique Strasbourg

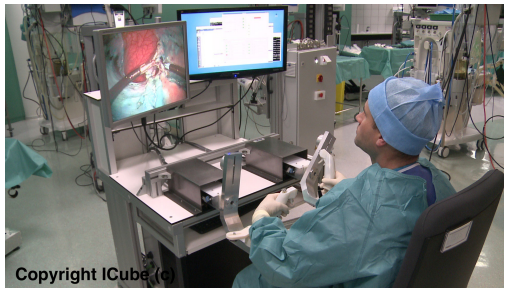
HealthTech | Main lines

Institute of information sciences and technology for healthcare

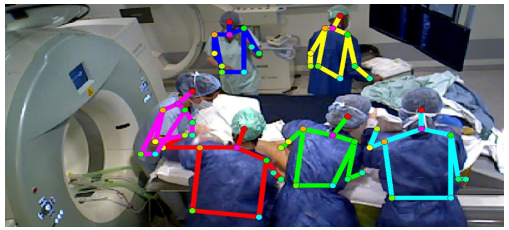
Innovation in medicine, digital healthcare and computer-assisted interventions



Credit: S. Cotin, Inria/ICube



Credit: ICube



Credit: CAMMA & ICube

Research cluster

- Two main research axes:
  - (i) systems for assisting diagnosis and medical and surgical procedures
  - (ii) science of medical data and patient modeling
- Cross-disciplinary and translational approach to the medical device, on the scientific level but also including ethical, societal and economic issues

Graduate school

- International Master to PhD training program
- Training through research

Master's degree in Science, Technology and Healthcare from the *University of Strasbourg*, with a specialty in HealthTech

HealthTech | Consortium: a dynamic and high-level environment

151 permanent researchers

+ many PhD and Master students positively impacted

> 2 Laboratories

ICUBE

BETA Bureau d'économie théorique et appliquée

> 5 Institutions and faculties

École d'ingénieurs Télécom Physique Université de Strasbourg

UFR de mathématique et d'informatique Université de Strasbourg

Faculté de médecine Université de Strasbourg

Faculté des sciences économiques et de gestion Université de Strasbourg

INSA STRASBOURG

> 4 Research and transfer partners

ihu INSTITUT DE CHIRURGIE GUIDÉE PAR L'IMAGE STRASBOURG

Inria

ircad France

BIOVALLEY france l'innovation santé

> 3 Doctoral Schools

msii ÉCOLE DOCTORALE

École Doctorale des Sciences de la Vie et de la Santé STRASBOURG

Augustin Cournot Doctoral School

HealthTech | Training program

HealthTech at a glance

- International graduate program fully taught in English
- Early hands-on experience in a research laboratory
- Fellowships for selected HealthTech fellows
- Networking & cultural events for international students
- Opportunities for PhD studies and the creation of start-up companies

2021/22 Master 2 class

A site of excellence at the **University of Strasbourg**

- ✓ One of the first universities in France
- ✓ 18 Nobel prizes since it was founded
- ✓ World class research facilities
- ✓ A privileged location in Europe
- ✓ Top-level partners in innovation
- ✓ A great quality of life for students

HealthTech | Training program

International graduate program

École d'ingénieurs | Master IRIV
Télécom Physique Strasbourg

- Elective courses and complementary research modules in a laboratory
- Pluridisciplinary training, involvement of full-time researchers and outside professors
- Project-integrated teaching

Data science

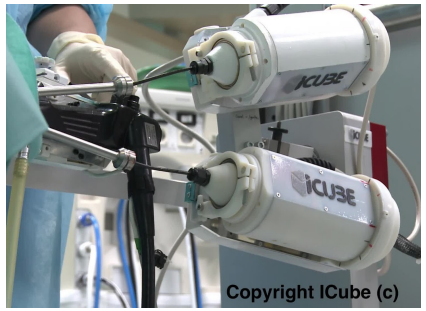
Medical device

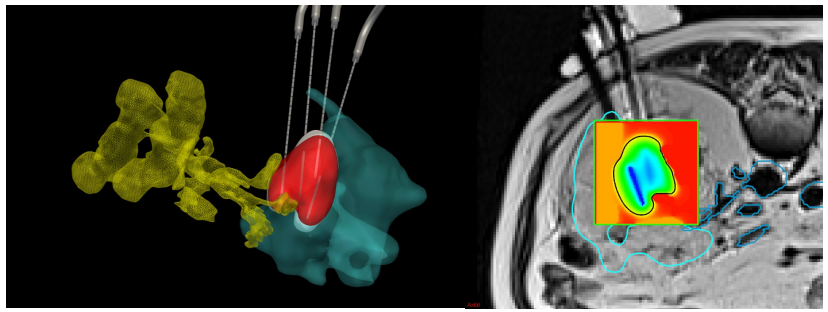
Economics & innovation

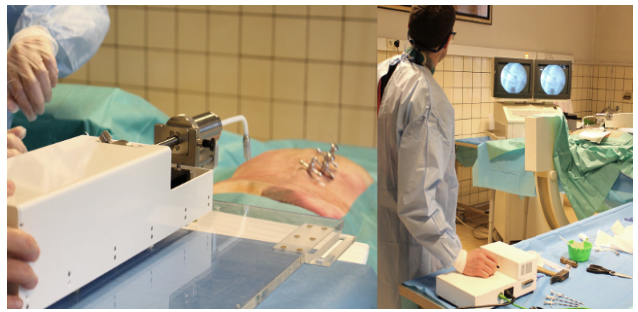
Medical imaging

Biomedical engineering

Research







On top of acquiring specific scientific skills, HealthTech students will also acquire the ability to understand the stakes and challenges relative to innovation in healthcare

HealthTech | Second year Master training program

Master 2 – 3rd semester | TEACHING UNITS & COURSES	ECTS
COMMON CORE | Quantitative physiology ● Computer-assisted medical interventions ● Creativity and innovation: an introduction	8
TRAINING THROUGH RESEARCH | M2 Research project	6
HEALTHTECH DISCIPLINARY COURSES *(elective courses: 2 teaching units out of 6 for incoming students)*	8 each

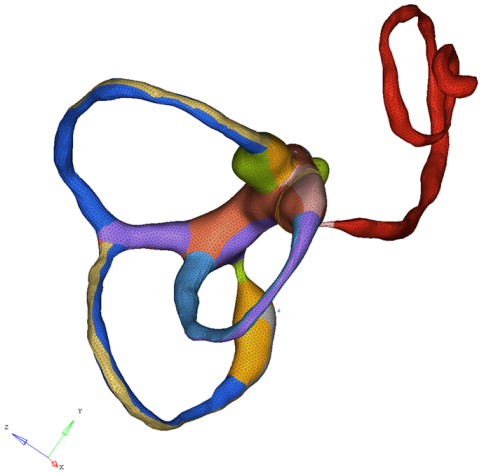
MODELING AND SIMULATION	MEDICAL ROBOTICS	BIOMECHANICS
Modeling of living systems ● Real-time simulation ● Graphical and geometrical modeling	Robotics ● Pose estimation ● 3D medical registration ● Robot control	Continuum mechanics ● Mechanical behavior of biological tissues ● Multiscale modeling ● Simulation in biomechanics
IMAGING PHYSICS	**MEDICAL IMAGE PROCESSING**	**ARTIFICIAL INTELLIGENCE**
Biomedical acoustics ● MRI physics ● Optical imaging ● Advanced MRI and clinical applications	Introduction to medical images processing ● Methods in advanced medical image processing ● Modalities and medical insight	Introduction to AI ● Machine learning ● Deep learning ● Selected topics in AI

Master 2 – 4th semester | TEACHING UNITS & COURSES	ECTS
END-OF-STUDIES INTERNSHIP | Master thesis oral defense ● Written report ● Internship work	27
TRAINING THROUGH RESEARCH | Initiation to research	3

HealthTech | Training through research

Master research projects

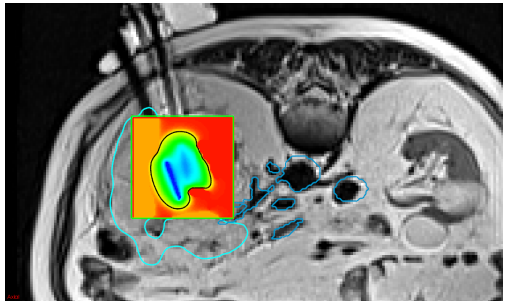
- Training through research: early immersion in a research laboratory of the HealthTech consortium
- Individual research projects throughout the academic year
  - Master 2 3rd semester – at least one day per week dedicated to the research project
  - Master 2 4th semester - 5 to 6-month end-of-studies internship



Credit: D. Baumgartner, ICube

Examples of research projects pursued in 2021/22

- Robotic assistance for blood-brain barrier opening using focused ultrasound (J. Vappou, F. Nageotte & L. Barbé) – *Adnan Saood*
- Biomechanical modeling and simulation of the human balance system (D. Baumgartner & A. Charpiot) – *Abdulmassih Saba*
- Guiding multiple needles on planned trajectories (C. Essert et A. Mukhopadhyay) – *João Victor Galvão da Mata*
- Solution for magnetic resonance elastography using artificial intelligence (S. Chatelin & G. Exarchakis) – *Claudia Boily*



Credit: C. Essert, ICube

HealthTech | Master fellowship

HealthTech Master fellowship

 ≈ 9k€ to 11k€

- **950€/month** for the 5 months of the fall semester for 2nd year Master fellows
- Tuition fees to enroll at the University of Strasbourg *(refund on receipt)*
- 500€ to cover **relocating expenses** for incoming students *(upon arrival)*
- 600€ to cover **travel expenses** for students living at less than 4000km from Strasbourg *(upon arrival)*

- 80% of the total fellowship for the academic year will be delivered at the end of the registration process (≈October)
- The remaining 20% will be delivered after completion of the academic year and reception of the academic transcripts of both semesters

Master 2 internship grant: spring semester

- End-of-studies internship in a HealthTech-affiliated laboratory
- Internship grant (3.9€/h i.e. **≈600€/month** for the 5 to 6 months of the internship)

HealthTech | What we offer

After validating the two semesters Healthtech fellows obtain the **IRIV Master, with Healthtech specialty**, from the University of Strasbourg

Training environment

- Small groups (max. 25 students), direct interaction with teachers
- Involvement of expert teachers (Professors, Chairs-holders, Researchers)
- Specifically developed courses
- Access to Telecom Physique Strasbourg facilities (high-rank engineering school)

Research environment

- Involvement of top researchers at ICube laboratory, IHU
- Large scope of research fields (robotics, AI, image processing, biomechanics, imaging physics)
- Interactions with medical doctors

Studies quality

- Strasbourg is a medium-size city, student city
- Cultural immersion program
- Scholarship
- Internship grant

HealthTech | Application information

If you are a high-ranking student interested in biomedical engineering… join us !

- Competitive Master track with selective entry
- Only selected students can enter the program and benefit from the fellowship
- ≈ 9 M1 and ≈ 13 M2 students selected among our local & international partners

Application procedure for Polimi students

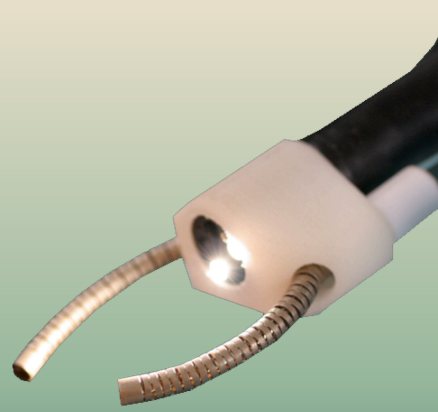
- Apply for Erasmus + mobility to Strasbourg at Polimi **(now)**
- Apply to Healthtech program. Applications will be opened **in Spring** on the « **eCandidat »** online platform
- Selection after evaluation by the pedagogical committee based on the application file – **results mid-June**
- Full application procedure available on the **« admission » page of our website**

https://healthtech.unistra.fr

Information Sciences and Technology for Healthcare | HealthTech

The Interdisciplinary thematic institutes of the University of Strasbourg & cnrs & Inserm funded under the Excellence Initiative program

Strasbourg, France



Discussion

For further information

- Information on the program https://healthtech.unistra.fr
- Information on the IRIV master https://www.master-iriv.fr/international/healthtech
- Contact for additional inquiries iti-healthtech-master@unistra.fr