

"Statistics and Computing for Health": a successful 10-year Bachelor of Science in South Brittany

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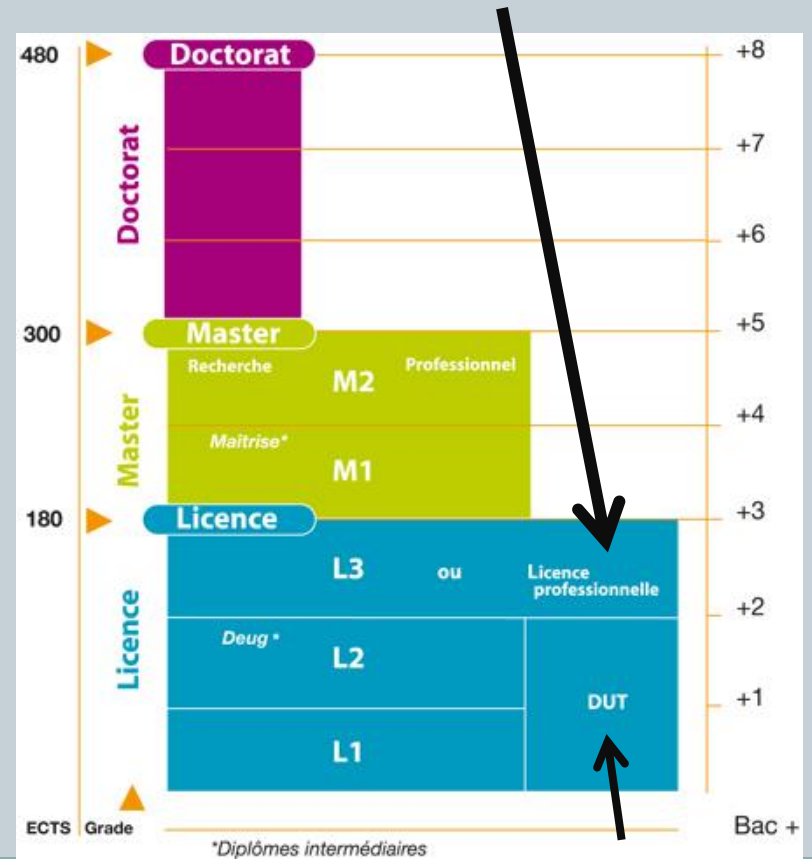
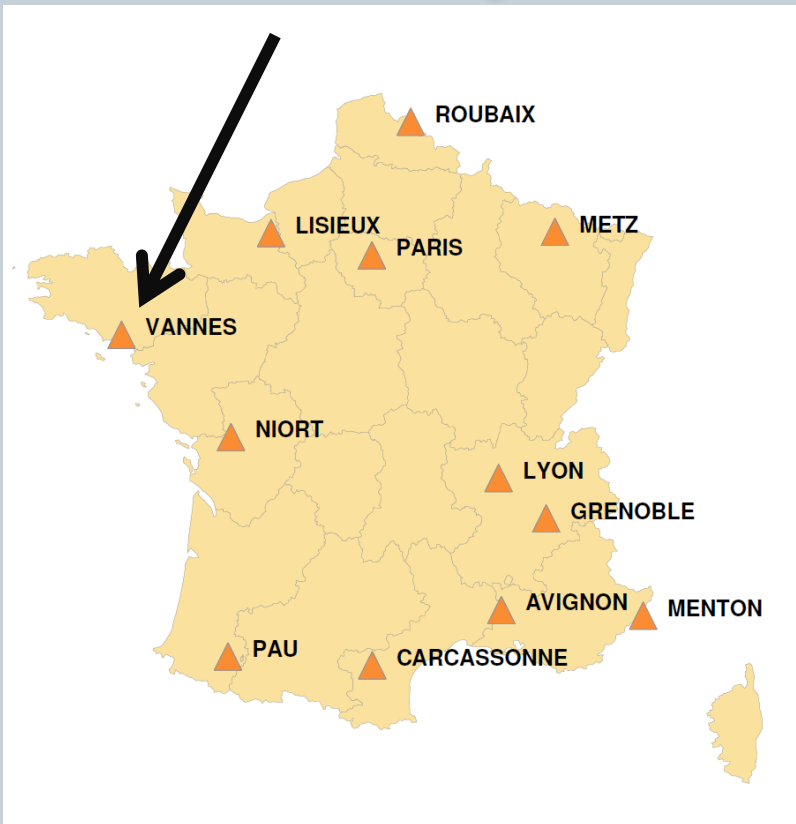
**INSTITUT UNIVERSITAIRE DE TECHNOLOGIE
VANNES, FRANCE**

3rd year degree (*Licence professionnelle*) Statistics and Computing for Health (SCH)

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Département « Statistique et Informatique
Décisionnelle » (STID)
Institut Universitaire de Technologie de Vannes
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Licence professionnelle in the
French educational system



STID

The French University System : two approaches of teaching

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- **Classic academic training**

- 80% of the students
- Theoretical courses
- Fewer teaching hours
- No mandatory traineeship

- **Fits into the European standard**

- Bachelor's (*Licence*): 3 years
- Master's (*Master*): 5 years
- PhD: 8 years

- **No selection at entrance**

- **Professional training**

- 20% of the students
- More practical courses
- Lots of projects
- Project management courses
- Mandatory traineeship
- Students are encouraged to work afterwards

- **Length of studies**

- *DUT* : Technological University Diploma: 2-year syllabus
- *Licence Professionnelle*: 1-year syllabus (3 years total)
- Engineering school: 3-year syllabus (=5 years total post-Baccalaureat)

- **Selection at entrance**

Students can switch from one path to the other

Brief description of SCH

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- Created : September 2004
- One-year syllabus (semesters 5 and 6)
 - 20 weeks of classes (474 hours)
 - 15 to 25-week traineeship (France or abroad)
 - 50% of the classes taught by business professionals
- Skills :
 - Statistics (172 hours)
 - Computer coding and Data Bases (143 hours)
 - Health: Clinical research, Epidemiology, Hospital data, Health insurance systems (94 hours)
 - Communication in French and English (65 hours)

Who and How we recruit :

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- **Mainly current 2nd year students:**
 - Students with a STID (Statistics and BI) diploma (75%)
 - Students with an academic mathematics/applied mathematics background (10%)
 - Students with any 2-year degree in science (computer science, biology, chemistry...) (5%)
- **Some mature students with professional experience (10%)**
 - People who want to change jobs
 - People who want to extend their knowledge in a particular field.

Traineeships in France and Abroad

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- **In France:**

- National Institutes of Health (like INSERM in France)
- Pharmaceutical firms (Sanofi, Servier,...)
- CROs (Biotrial, Keyrus, Lincoln...)
- Hospitals

- **Abroad:**

- Australia : Australian Institute of Health and Welfare (Canberra)
- Belgium : Business and Decision Life Sciences (Brussels)
- Germany : Accovion (Eschborn)
- Switzerland : Novartis (Basel), Centre Hospitalier Universitaire (Lausanne)
- United Kingdom : University Hospital (Manchester)
- United States : Dartmouth Medical School (Hanover, NH), University of South California (Los Angeles, CA)

What do we teach in computer science?

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- **Focus on software:**
 - Statistical programming
 - ✦ SAS : ~45h
 - Refresher course : 15h
 - Academic courses : 20h
 - 2-day seminar by professionals : 10h
 - ✦ R : 20h
 - Relational Database Management Systems
 - Oracle, mySQL : 22h
 - BI, Reporting
 - Business Object : 24h
 - Data Management : 18h

What do we teach in Statistics?

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- **Focus on methods:**
 - Discriminant analysis
 - Logistic regression
 - Data mining
 - Geographical statistics
- **Focus on Biostatistics:**
 - Survival analysis
 - Clinical experimental designs
 - Data qualification

After 10 years

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- 202 students
- 196 graduates (97%)
 - 59% found work just after the diploma
 - 41% entered a Master's programme
 - 4% did a thesis
- 91% work in France
 - 9% work abroad :Belgium, Canada, Germany, New Zealand, Thailand)

Present job

among 145 working graduates (completed studies)

CRO= Contract Research Organization

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Activity and type of structure	Frequency	%
Data Management and/or Statistical programming in a CRO or pharmaceutical firm (medical data)	32	22
Data management and/or Statistical programming in a hospital (administrative data)	18	12
Biostatistician in a CRO or pharmaceutical firm	23	16
Clinical research in hospitals	12	8
Epidemiology or health monitoring	10	7
Health insurance and social agencies	17	12
Thesis (most in Epidemiology)	7	5
Working outside of the health field	26	18
Total	145	100

Main changes in teaching over 10 years

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- **2007:**
 - **DBMS and Algorithmic is extended to all students** (only students in refresher course before)
 - Algorithmic is completed by **R coding**
 - Emphasis is put on the **quality of the data**
 - Teaching of **SAS is reinforced** (18h in refresher course + 21h in the core – only 15h in refresher programme before)
 - Introduction of **Technology Watch**
- **2008:**
 - **Project** is linked to teaching in **Project management and quality of the data**
 - Teaching of **SAS reinforced again** (18h in refresher course + 30h in the core)
- **2011:**
 - Agreement with the university to mutualise some teaching and propose some of the *Licence Professionnelle* as optional units of the regular 3rd year degree (*L3*). Examples : Epidemiology, Statistics for clinical research, Survival analysis...
 - **Algorithmic teaching is removed**, replaced by teaching of **Optimization in SAS**
- **2014 - 10th anniversary**
 - launch of discussions with CROs about the **best combination of Statistical programming and Data management** in the **Computing courses**, **STILL OPEN!**
 - Web programming is removed

A new focus on Data Management

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- Rules, security and good practice in Data Management
 - CFR Part 11
 - Electronic signatures
 - Cdisc norms
- eCRF
 - How you make it, how you use it, how you check your results
- Which role for whom ?

But the main change is elsewhere !

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- Over the first three years:
 - Fewer than 20% of the graduates entered a Master's after the *Licence professionnelle*
- Now:
 - About 90% of the graduates do so
- So the main challenge is to recruit students who want to work right after graduation
- Sandwich course could be a possibility

Prospects for the coming years

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- Opening of the program to sandwich courses
- Evolution of the profiles of the students :
 - Recruiting more students with a health background
 - ✦ Making contacts with other educational institutions
 - ✦ Reinforcing support for those students
 - Recruiting more mature students from the health field looking for knowledge in Statistics
 - ✦ Strengthen partnerships with the health industry
 - ✦ Could benefit from the sandwich course option

What might the programme look like in 10 years?

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- Following trends in a quickly evolving field
 - Opening up to big data technologies
 - Widening our software scope
- Teaching differently
 - Using more connected technology
 - Interactive boards, connected classrooms
 - More individualised teaching
- Adapting to what the professional world needs

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So, we are waiting for your feedback!

Some questions about the content of the course

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- The right balance between Statistics and IT for a BSc qualification?
- How to prepare students in Data Management?
- Using R ? Or only SAS?
- Data visualisation ?
- Web programming or not?
- Who wants to teach in Vannes?