

EUROPEAN SCHOOL OF ANTENNAS
ESoA 2012



UNIVERSITÉ
EUROPÉENNE
DE BRETAGNE

MM-WAVE ANTENNA DESIGN AND TECHNOLOGIES



4th Edition - 21-25 May, 2012

Supported by ESF Research Networking Programme "NEWFOCUS"



Course Summary

Course co-ordinator: Ala Sharaiha
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1. Summary

This document presents a report about the Mm-wave Antenna Design and Technologies course that took place in IETR- University of Rennes 1 from the 21th of May to the 25th May 2012. The course was attended by 28 students, Two of which benefitted from New Focus scholarship that covered the inscription.

The course provides the attendees with a large overview on planar antenna applications, physical principles and technology. Non planar structures are also addressed for mm-wave antennas. Emphasis is put on technological aspects (microstrip, microtechnologies, MEMS, metrology...) and specific field of applications (satellite antennas, mobile phones, base stations, car ACC radar...). The structures and parametric studies presented in the course are validated by CAD softwares (HFSS, Ansoft Designer, etc.). The module gives the student a thorough background of mm-wave antennas and arrays than the printed antennas, including lenses, reflectors, leaky-waves, dielectric resonators, dielectric rods, Gaussian Beam Antennas, EBG antennas, etc. The course is accompanied with pattern measurements in mm-wave anechoic chamber and impedance measurements on VNA (Vector Network Analyzers).

2. Speakers

The expenses of Professor Lorentz Schmidt were covered by the support given within the framework of the ESF activity "New Focus"

	Name	University	Country	Hours of Lectures
1.	Prof. Ala Sharaiha	University of Rennes 1	France	5
2.	Dr. Jean Marie Floch	Institut National des Sciences Appliquées de <i>Rennes (INSA)</i>	France	1
3.	Prof. Kouroch Mahdjoubi	University of Rennes 1	France	3
4.	Dr. Laurent Le Coq	University of Rennes 1	France	6
5.	Prof. Lorentz Schmidt	University of Erlangun Nürnberg	Germany	3
6.	Prof. Mohammed Himdi	University of Rennes 1	France	3
7.	Dr. Olivier Lafond	University of Rennes 1	France	2
8.	Prof. Raphael Gillard	INSA	France	3
9.	Prof. Ronan Sauleau	University of Rennes 1	France	3
10.	Dr. Sylvain Collardey	University of Rennes 1	France	6

3. Lecture Program

Course on « MM-Wave Antenna design and Technologies »				
IETR- Université de Rennes 1, 21-25 May 2012				
Monday, 21th	Tuesday, 22th	Wednesday, 23th	Thursday, 24th	Friday, 25th
Welcome 8 :30 - 9:15				
Planar Antennas I A. Sharaiha 9:15-10:00	Reflectarrays and DRA I R. Gillard 9 :00-10 :00	Lab L. Le Coq, S. Collardey, M. Ettorre 8:00-10:00	Materials Characterisation and Near field Imaging I L. P. Schmidt 9:00-10:00	Main applications J.M. Floc'h 9:00-10:00
Coffee Break				
Planar Antennas II A. Sharaiha 10 :15-12 :15	Reflectarrays and DRA II R. Gillard 10 :15-12 :15	Lab L. Le Coq, S. Collardey, M. Ettorre 10 :15-12 :15	Materials Characterisation and Near field Imaging II L. P. Schmidt 10 :15-12:15	Metrology K. Mahdjoubi/M. Drissi 10 :15-11:15 Slotted waveguide, Leaky wave & horn antennas M. Himdi 11 :15-12:15
Lunch				
Planar Antennas III A. Sharaiha 14 :00-16 :00	Specific mm-wave technologies M. Himdi 14 :00-16 :00	Lab L. Le Coq, S. Collardey, M. Ettorre 14:00-16:00	MEMS & reconfigurable antennas and Lens I R. Sauleau 14:00-16:00	
Coffee Break				
Antenna arrays and EBG K. Mahdjoubi 16 :15-18:15	mm-wave antennas active & reconfigurable antennas + characterisation LaB O. Lafond. 16 :15-18 :15		MEMS & reconfigurable antennas and Lens II R. Sauleau 16:00-17:00 Test & Discussion 17:00-18 :30	
		Social Dinner 19:30		

4. Participants

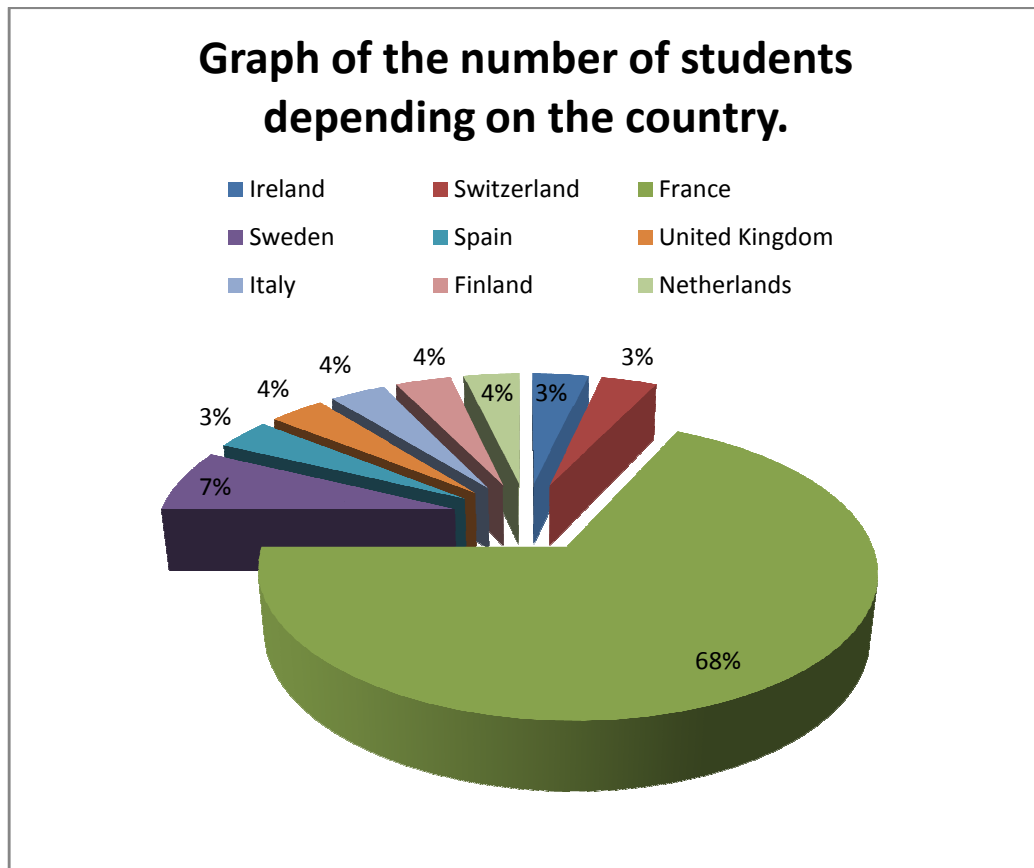
The list shows the students participating to the course.

N°	Student Name	University or Company	Country
1.	Andrea Giannini	Pavia University	Italy
2.	Antoine Dumoulin	Dublin Institute of Technology	Ireland
3.	Baptiste Hornecker	École polytechnique fédérale de Lausanne [EPFL]	Switzerland
4.	Cedric Martel	ONERA-The french Aerospace Lab	France
5.	Elena Abdo Sánchez	University of Malaga-ETSI Telecommunication	Spain
6.	Esperanza Alfonso	Chalmers University of Technology	Sweden
7.	GARCIA Pierre-Antoine	University of Rennes 1	France
8.	Gwenn Le Fur	SATIMO Industries	France
9.	Hervé Merlet	Canon Industries	France
10.	José Enriquez Gonzalez	Telecom Paris Tech	France
11.	Mohamad Abbas	University of Birmingham	United Kingdom
12.	Rousstia, M.W.	Eindhoven University of Technology	Netherlands
13.	Semkin Vasillii	Aalto University	Finland
14.	Sona Carpenter	Chalmers University of Technology	Sweden
15.	ERIO GANDINI	University of Rennes 1	France
16.	ABDOU FALL	Institut National des Sciences Appliquées de Rennes (INSA)	France
17.	Haiyang Zhang	University of Nantes	France
18.	Hedi Raggad	ESEO-Angers	France
19.	Yuwei Zhou	University of Nantes	France
20.	RAMANANDRAIBE ESTHELLADI	ESEO-Angers	France
21.	Karim Tekkouk	University of Rennes 1	France
22.	Tran Vu La	University of Rennes 1	France
23.	Narcisse Rimbault	University of Rennes 1	France
24.	Bruno Santucq	University of Rennes 1	France
25.	François Sarrazin	University of Rennes 1	France
26.	Duo Wang	Institut National des Sciences Appliquées de Rennes (INSA)	France
27.	Jusoh Taufik		France
28.	Mario Martinis	University of Rennes 1	France

There was 28 students of which:

- 14 paying; 5 grants (2 from NEWFOCUS, 2 from Cost Assist)
 - 13 from Universities;
 - 3 from Industries;

➤ 14 from IETR (University of Rennes, INSA, University of Nantes and Eseo)



The group photo of the students with some of the course speakers and the co-coordinator Prof. Ala Sharaiha is shown below.



Fig 1. Photo behind IETR building at the University of Rennes 1

6. Lunches, social dinner and boat trip

Lunches for the five days were arranged in the university of Rennes Cafeteria, located at 5 minutes walk from the conference room at IETR. The cost of lunch was included in the course registration fee. Two coffee breaks were arranged every day. After 18:15, students were free to explore the city of Rennes. A social dinner was organized on Wednesday 23th of May at restaurant CREPERIE SAINTE ANNE, located in the city center of Rennes. The group photo of the social dinner is shown below.



Fig 2. Social Dinner I – Creperie Saint Anne in down town Rennes



Fig 3. Social Dinner II



Fig 4. Social Dinner III



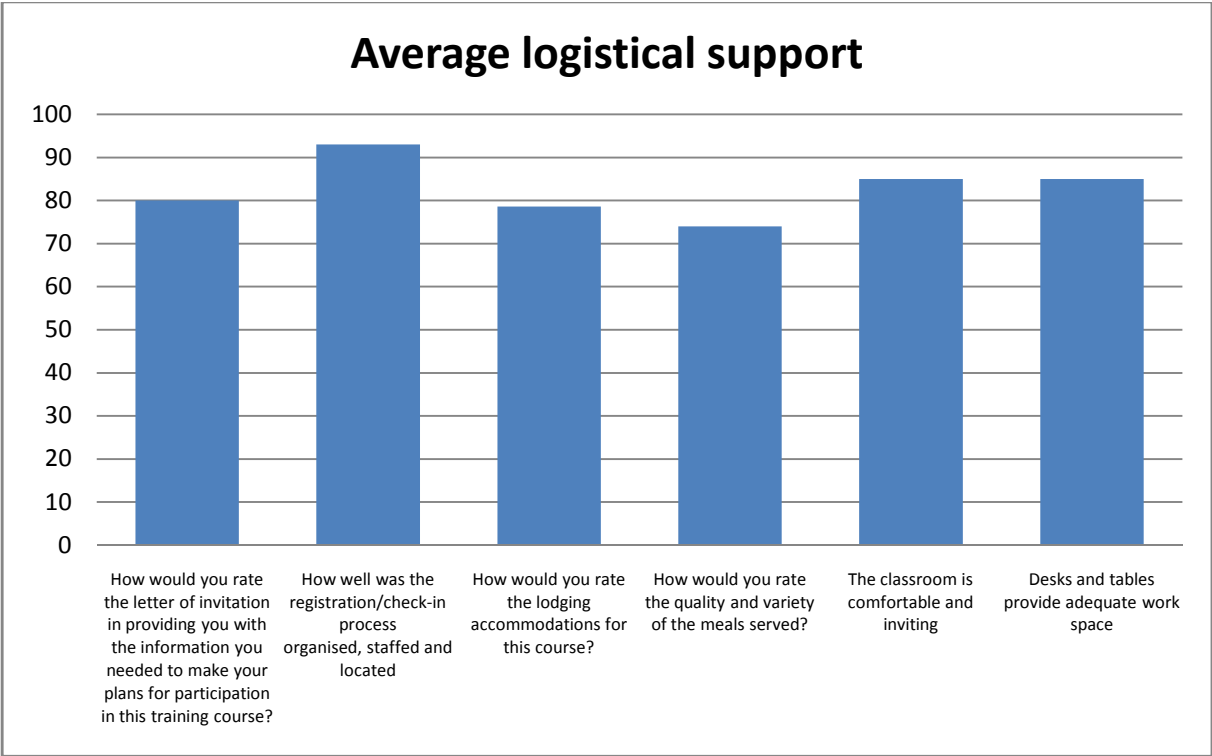
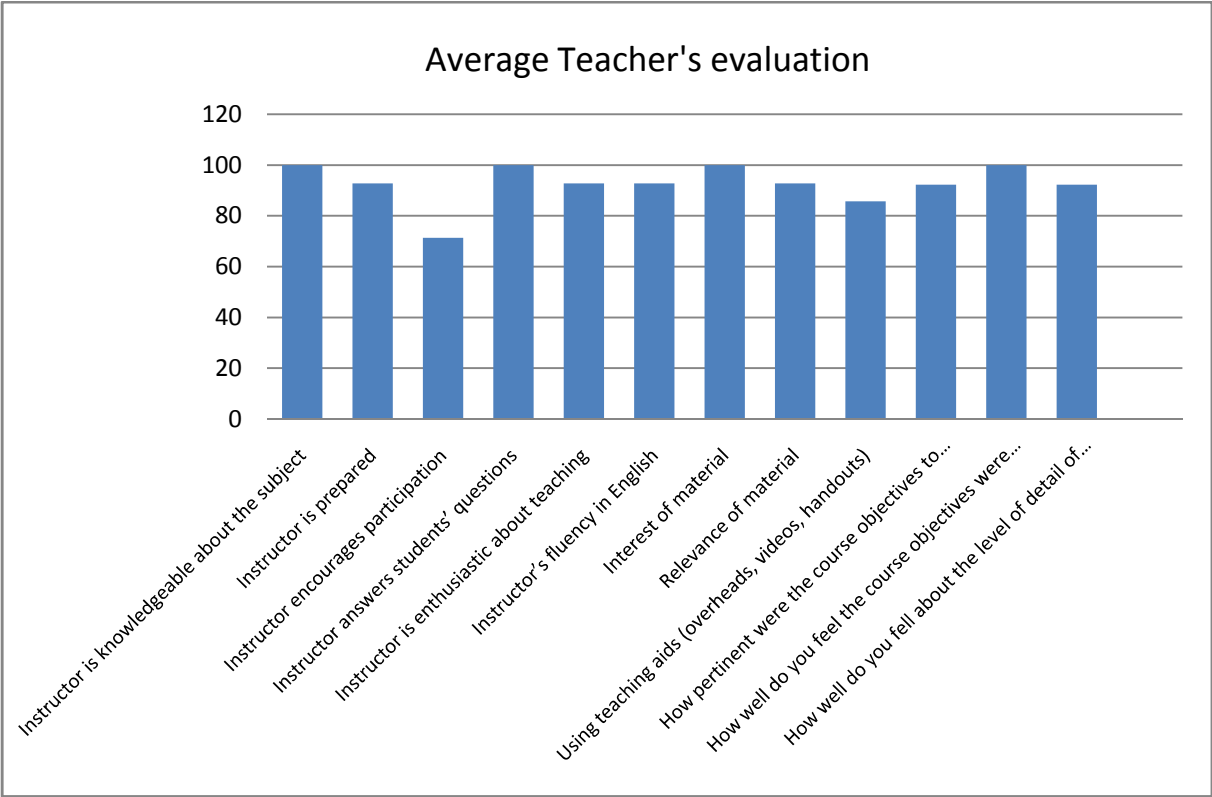
Fig 5. Social Dinner IV

6. Courses Evaluation

The different backgrounds of the attendees lead to lively exchanges during the whole week and all gave very positive feedback about the unique set of information and know-how provided on mm-wave antenna design and Technologies.

The standard ESoA evaluation form was distributed to the students; all 28 students completed the evaluation form. After the outcome of the evaluation form and after

discussion and interaction with the students, we have noticed a global satisfaction; however, some weak points have been detected, which will be useful to be considered for improving the next edition of the course.



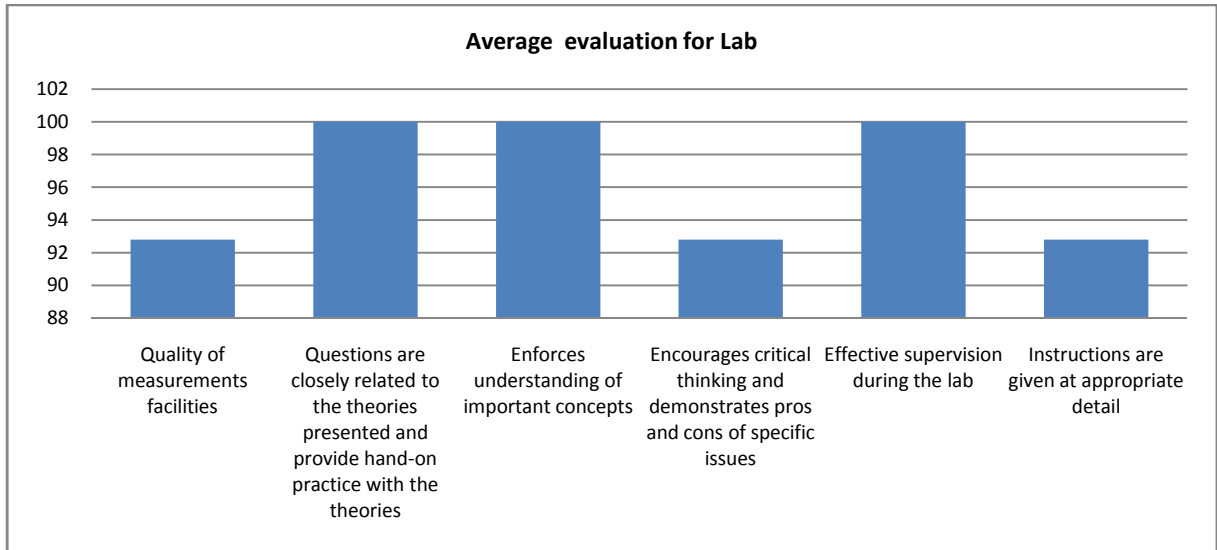


Fig 6. Course Lab-I

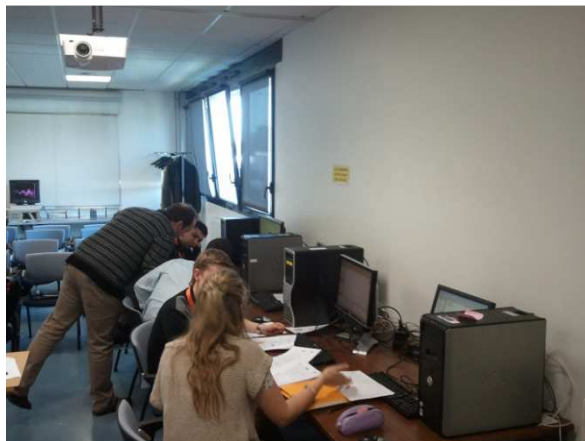


Fig 7. Course Lab-II



Fig 8. Course Classroom I



Fig 9. Course Classroom II