

# NANOSIL – WP5

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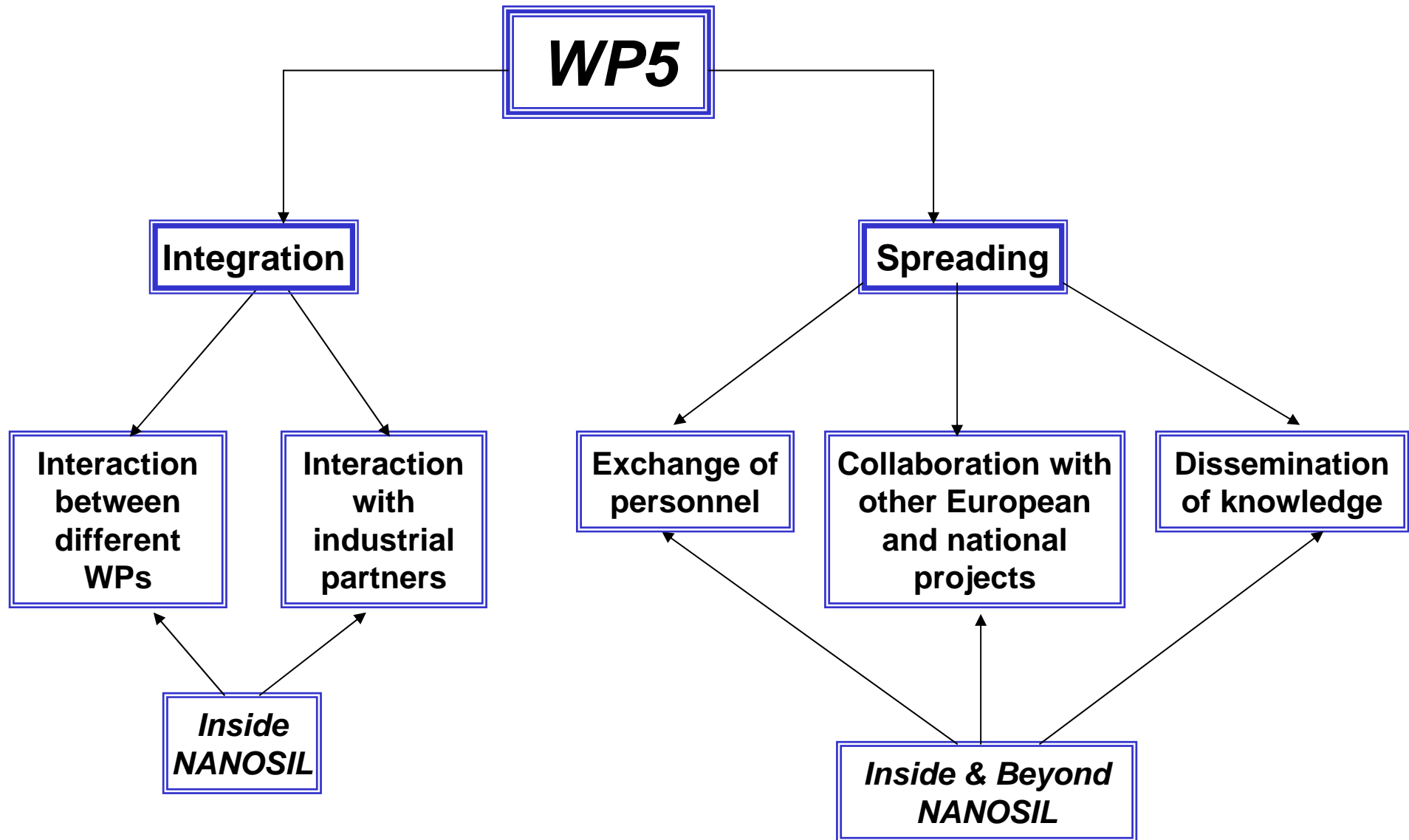
## « Integration and spreading of excellence »

- **WP leader:** Prof. D. Flandre, Dr. V. Kilchytska  
UCL, Louvain-la-Neuve, Belgium

- **Participants:**

GRENOBLE INP	<u><b>WARWIK</b></u>	<u><b>RWTH</b></u>	<u><b>KTH</b></u>
<u><b>IUNET</b></u>	<u><b>UCL</b></u>	IMEC	CEA
ST	ISEN	UPS	AMO
FZJ	TUBS	USTUTT	NCSR «D»
TYNDALL	WUT	URV	CHALMERS
EPFL	ETHZ	GU	SNPS
LIVUNI	UNEW	QD	

# Objectives of WP5



# Integration

## □ **Coordination by WPs (FPs) leaders:**

- **programming of joint activities,**
- **regular updating ,**
- **joint meetings,**
- **cross-WP (FP) activities**

### **DURING 2010-11:**

✓ **58 joint activities** (38 in 2008, 47 in 2009)

✓ **27 is JP** (more than 150 wafers were processed) and **21/11 is JC/JM**)

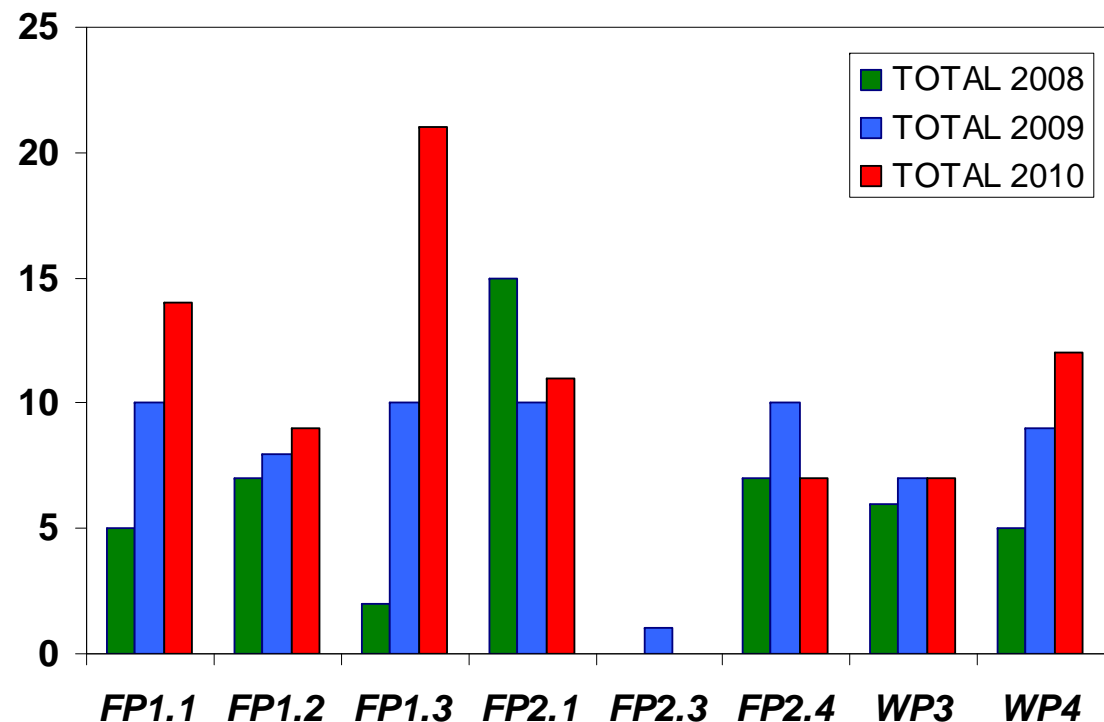
⇒ **20% more than last year**

⇒ **significant increase in**

**JC/JM activities**

(in 2008: 2/3 JP + 1/3 JC/JM

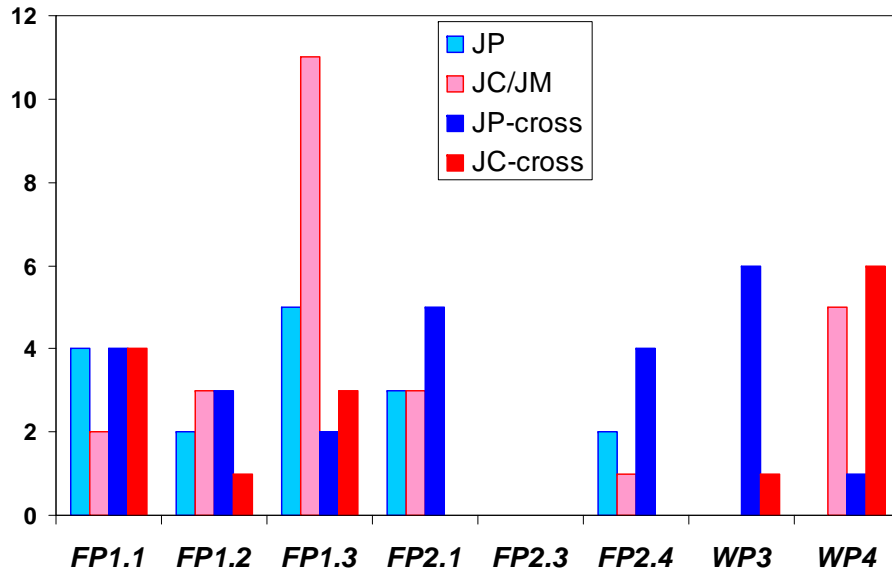
in 2009: 1/2 JP + 1/2 JC/JM)



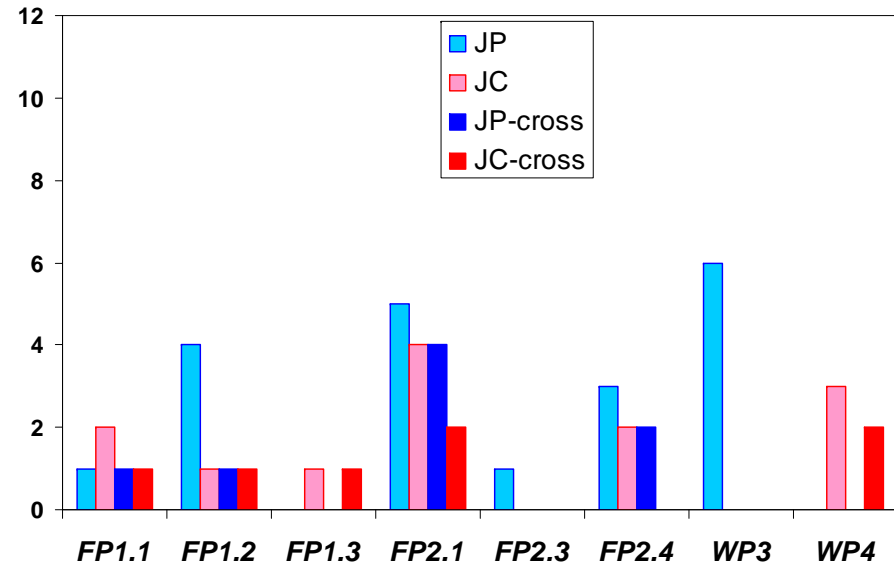
# Within FP vs. cross FP & JP vs. JC/JM

# Integration

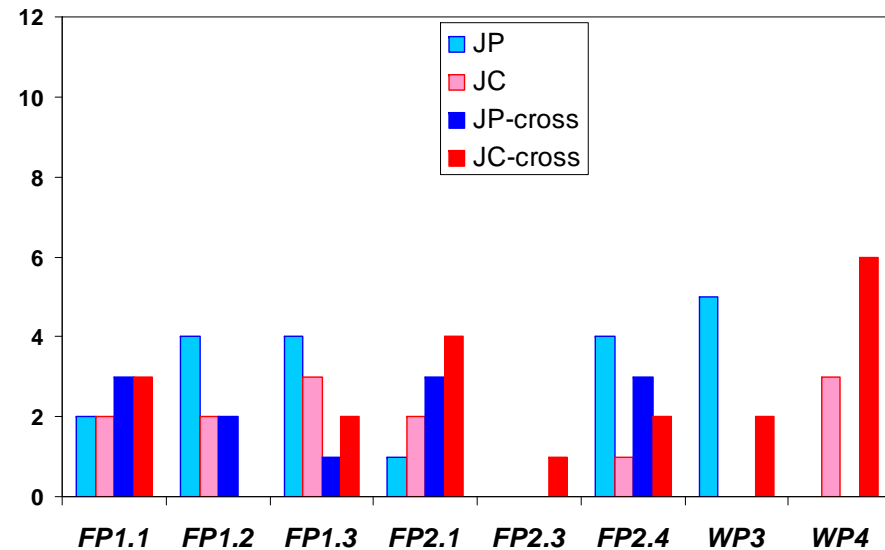
2010-11



2008



2009

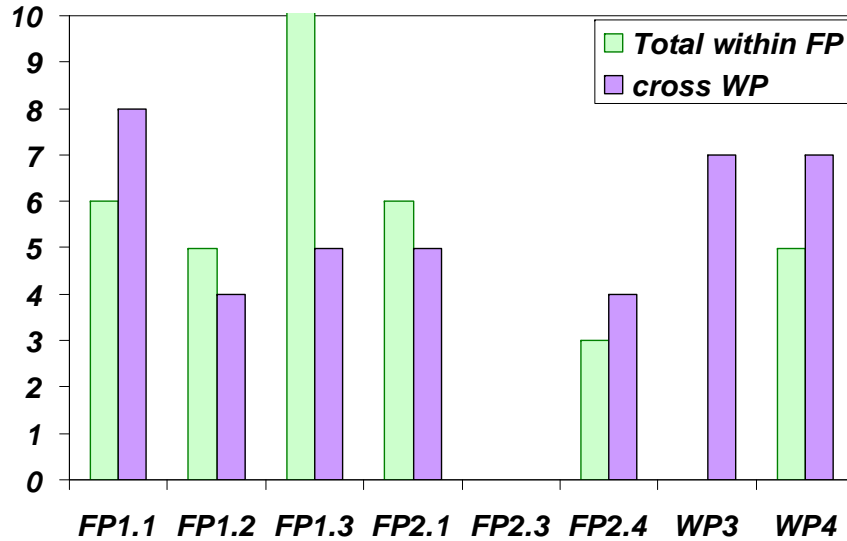


- Increase of cross-WP/FP activities (particularly JP-cross)
- Increase of JC
- More uniformity between FPs (WPs)

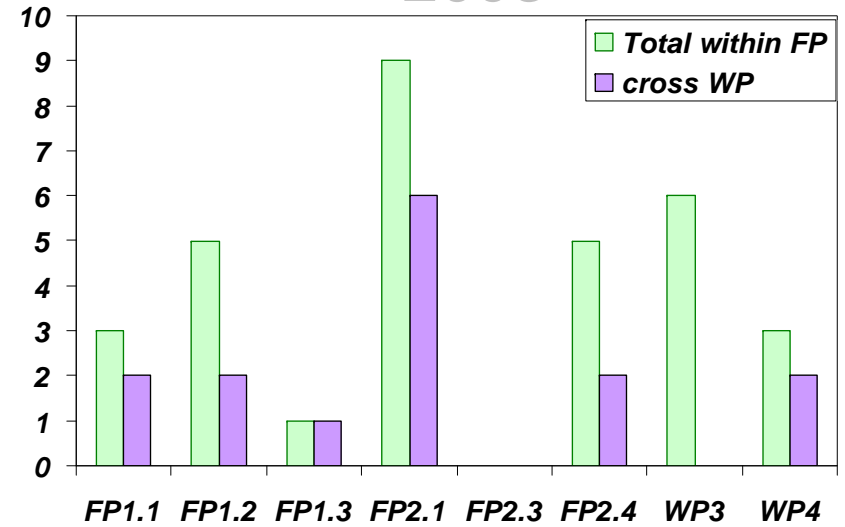
# Within FP vs. cross FP

# Integration

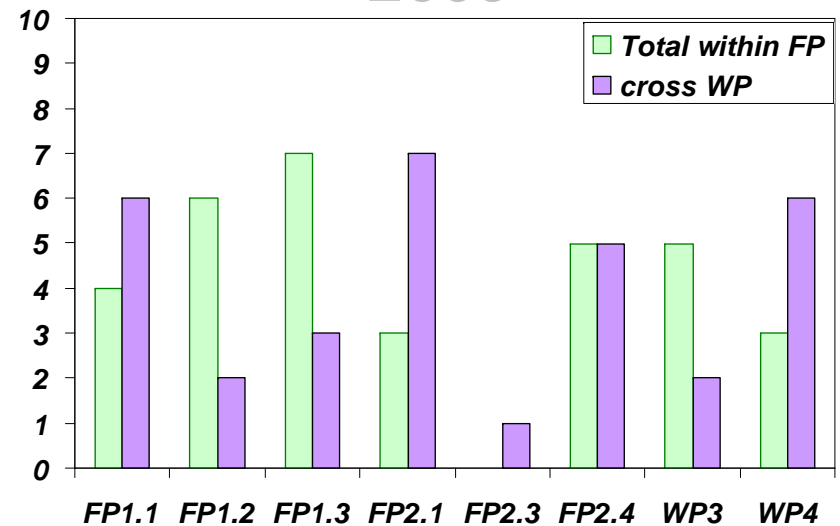
2010-11



2008



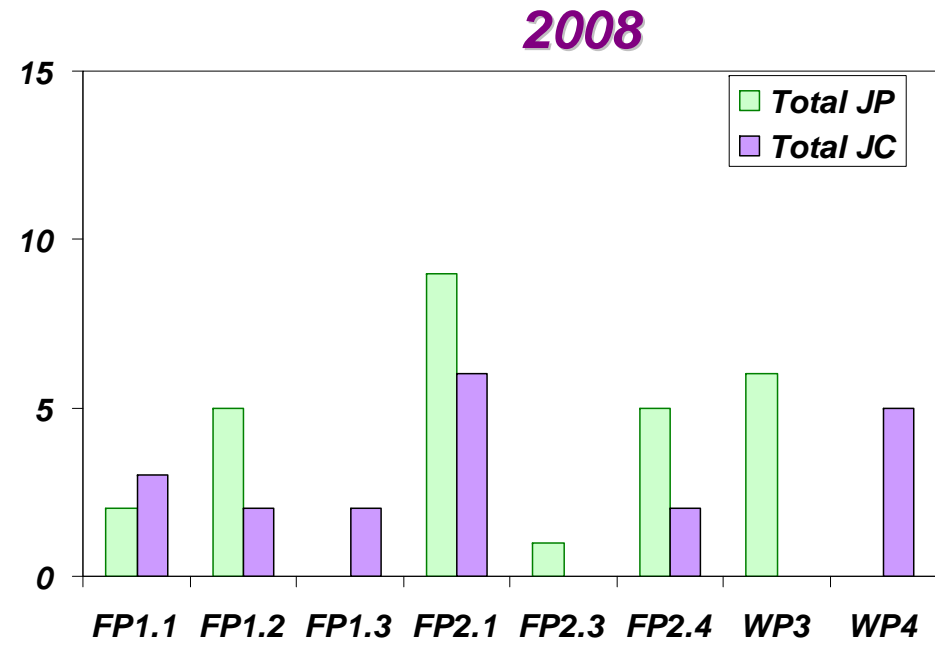
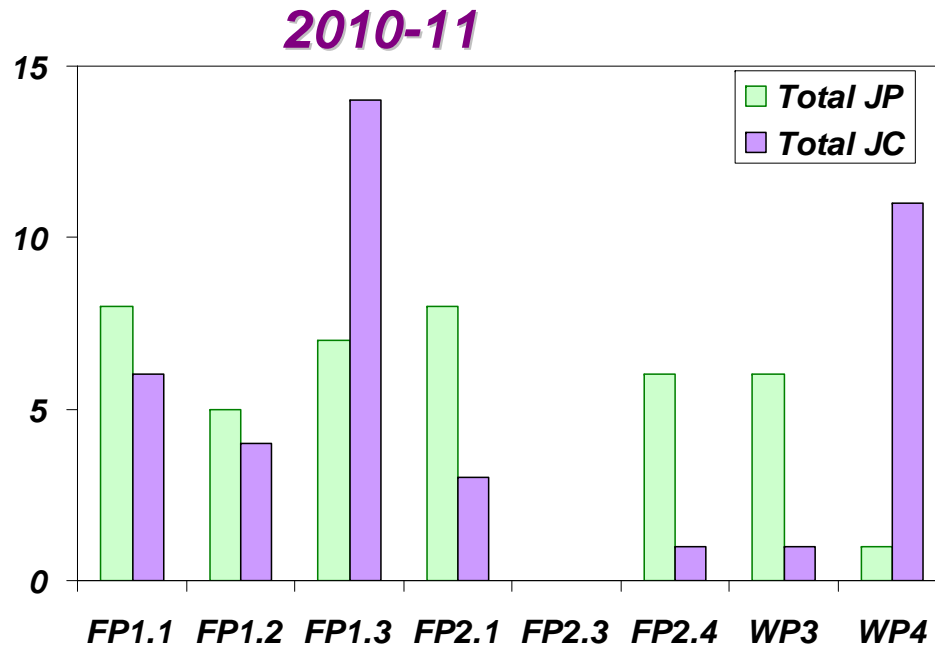
2009



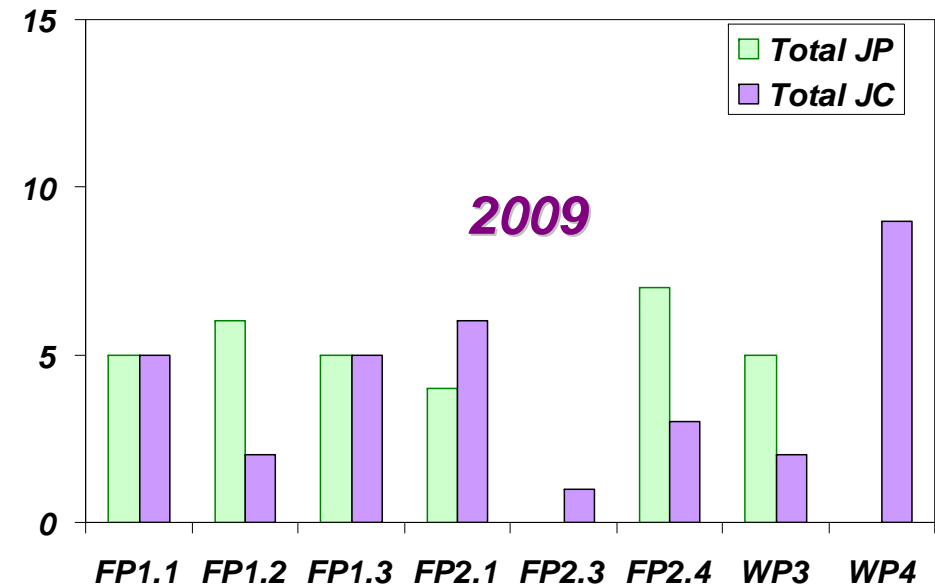
**Increase of cross-WP/FP activities**  
**More uniformity between FPs (WPs)**

# JP vs. JC

# Integration



**Clear increase in JC activity**  
**More uniformity between JP & JC activities**



# Integration

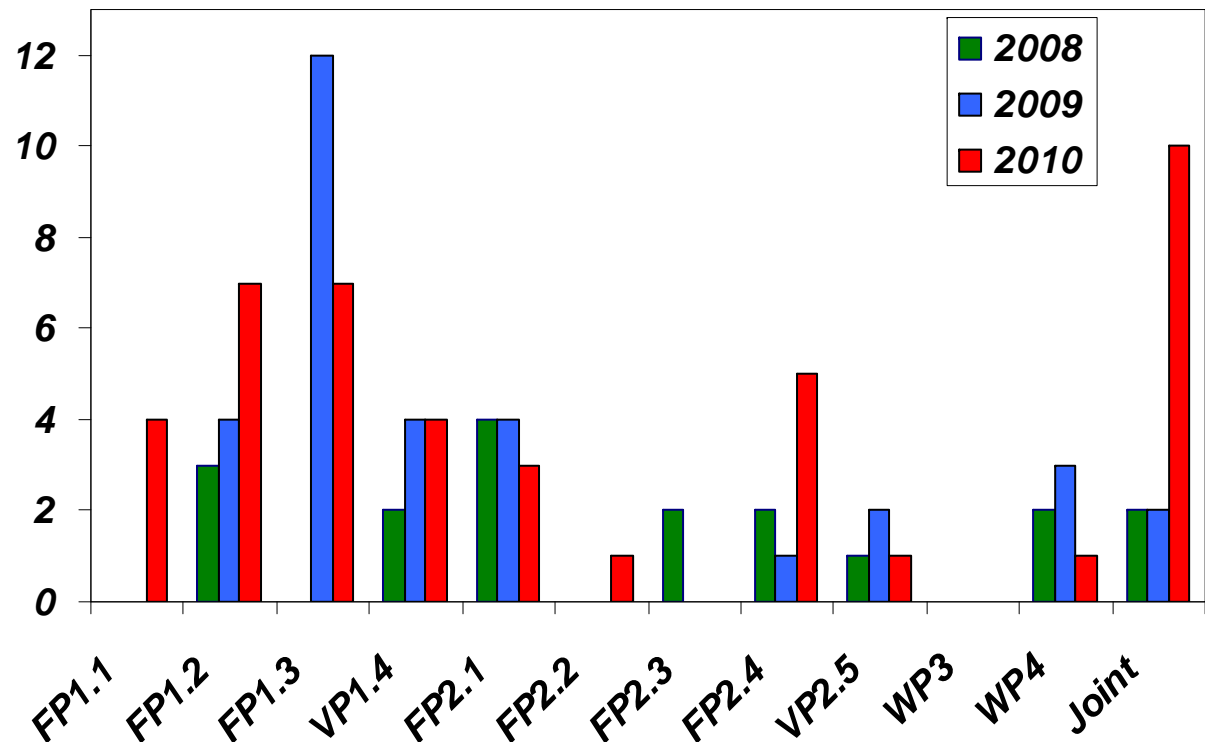
## □ *Coordination by WPs (FPs) leaders:*

- *programming of joint activities,*
- *regular updating ,*
- *joint meetings,*
- *cross-WP (FP) activities*

### **DURING 2010-11:**

✓ **41 'technical' meetings**  
*between partners*  
*(32 in 2009, 18 in 2008).*

✓ **including 10 cross-WP**  
*meetings, comparing to*  
*only 2 in 2008 & 2009.*



# Integration

## □ Common PhD students

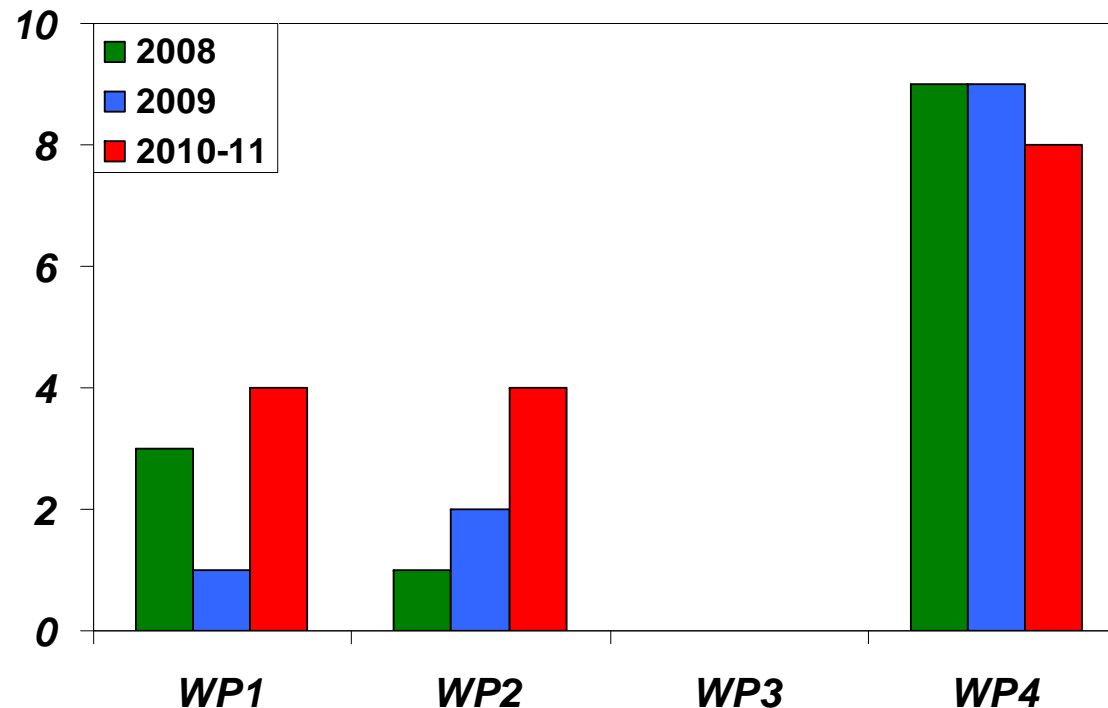
**DURING 2010-11:**

✓ **10 common PhD students (12 in 2008, 10 in 2009)**

**8 of them devoted to WP4**

**7 of them are with industrial partners (7 in 2009 and 6 in 2008)**

**6 of them are devoted to two WPs.**



## □ “Who is Who” guide:

- **Completed in Sept 2008; Updated yearly.**
  - *brief description of organization;*
  - *processing (facilities/equipment + techniques/competences);*
  - *characterization & modelling (facilities/equipment + techniques/competences).*
- **Available through Nanosil *web-site in a public area.***
- **Interactive information is introduced in a partners list.**
- **Search by “competence” is available**
- **“Who is Who” of associated partners is introduced (based on exchanges and open for other members, e.g. partners of national projects or other interested); regularly updated.**
- **Request for Beyond Nanosil partners to be included in “Who is Who” of associated partners is available on the Nanosil web-site.**

# Integration

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## □ **Open questions & Technical problems:**

- *regularly requested (twice per year),*
- ***no any input in 2010-11***
- ***does not considered as absence of problem... they are just solved/discussed on the FP/WP level***

## □ **Breaking news:**

- ***Introduced in 2009***
- ***The idea is to advertise top-level (hot) achievements in Nanosil***
- ***Monthly update***
- ***On the web-site in a public area***

# Integration

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□ ***Interaction with industrial partners*** aims at roadmapping, assessing the results and assure their transferability to industry

- *participation in E&SC meetings*
- *each FPs has “industrial contact/monitor”*
- *common PhD students: 7 in 2010-11*
- *common projects (EU, national): 19 on-going in 2010-11 (11 in 2009) and 14 newly accepted/submitted for 2011 ( 8 in 2009, similar numbers as in 2008)*
- *industrial partners were asked to provide us information about available courses/scholarships/trainings/PhD available.... This information (&links) is available on the Nanosil web-site. Regularly updated.*

# Collaboration with other projects

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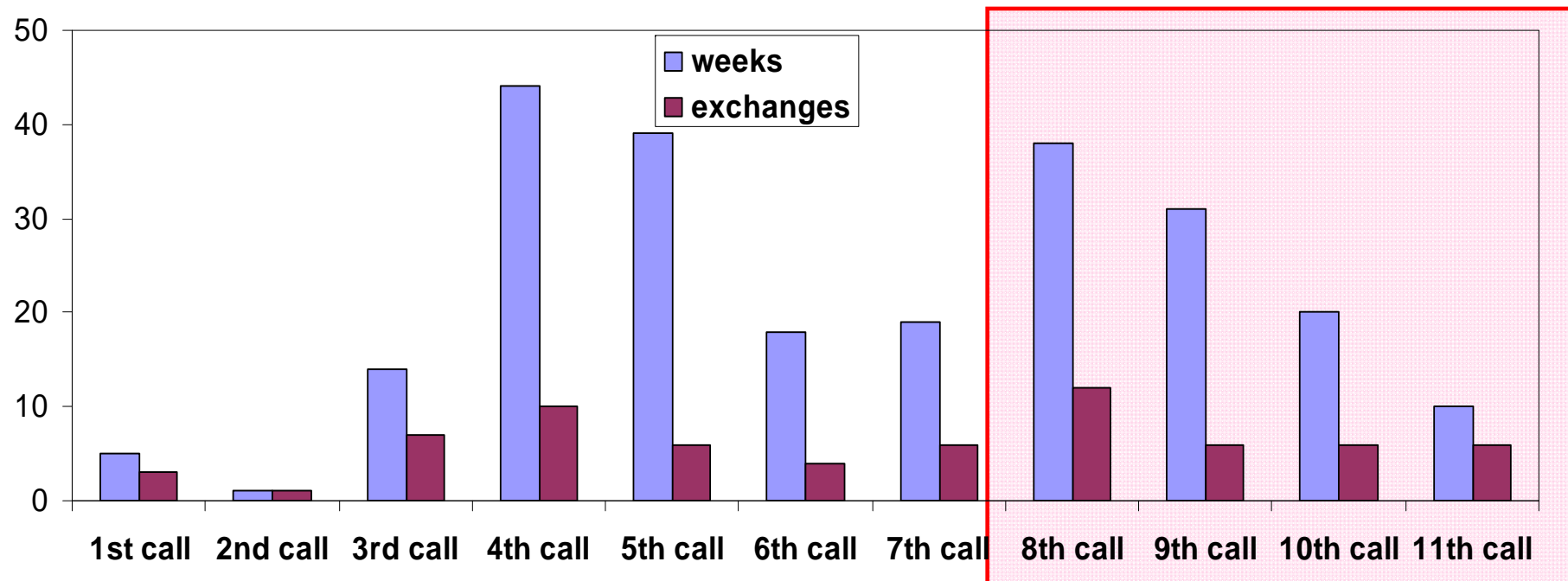
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- ❑ **13 European projects in 2010-11** (10 of them are FP7)
- ❑ **3 International projects** (involving USA, Japan and Korea)
- ❑ **22 national projects** (7 in UK, 5 in Poland, 2 in Ireland, France, Germany and Sweden)
- ❑ **Updated lists of European and national projects of relevance is available on the Nanosil web-site.**
  
- ❑ **25 NEW Projects** have been submitted/accepted **during 2010-11** by Nanosil members (the same number as in 2009)
  - **6 FP7 + 1 Catrene projects**
  - **18 national projects** (5 in France, 3 in UK, 2 in Spain, Ireland, Poland, Belgium and 1 in Germany, Switzerland)
  - **14 of these new projects were submitted in collaboration** between 2 and more Nanosil partners

# EXCHANGES

## ***DURING 2010-11:***

- 4 Calls for exchanges have been issued electronically***
- Last call was in September 2010, while in view of project extension, scheduled exchanges were allowed to be performed till end of February 2011***
- 30 exchanges for the total duration of 98 weeks have been selected by E&SC during 2010 (26 of 120 weeks in 2009 and 11 of 20 weeks in 2008).***
- among them there are 6 exchanges of 24 weeks with beyond Nanosil***

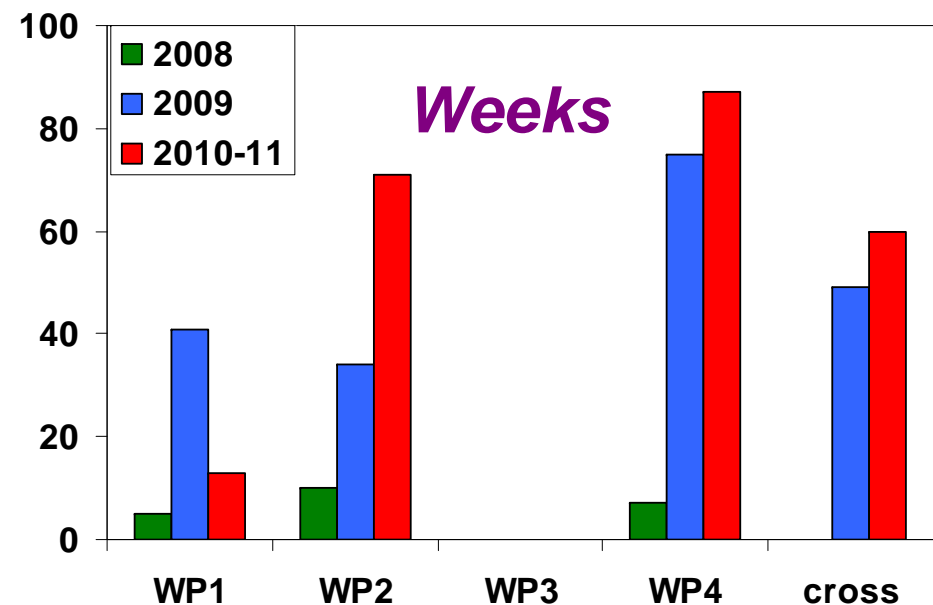
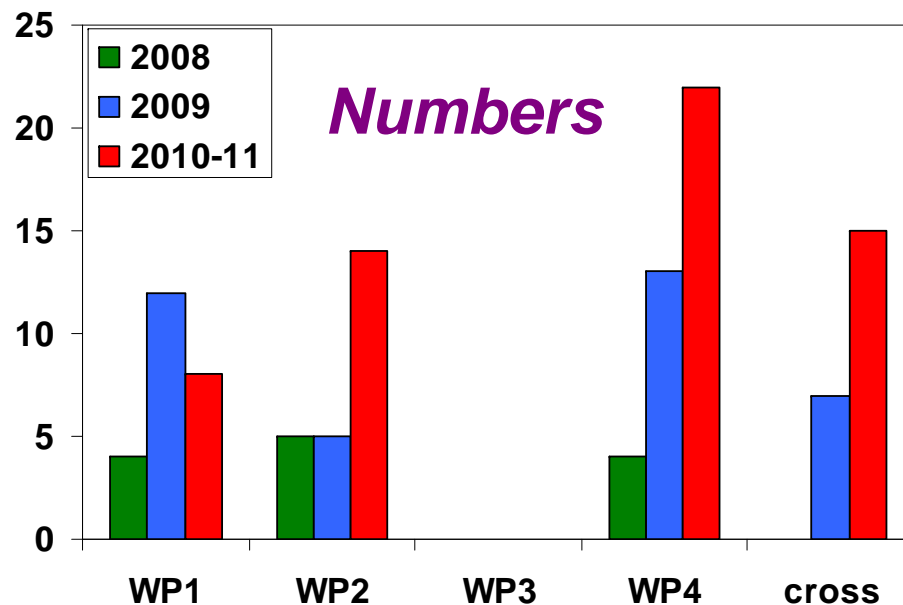


# EXCHANGES

## ***DURING 2010-11:***

- ***29 exchanges with total duration of 111 weeks have already been done during 2010-11 (23 of 104 in 2009 and 7 of 12 weeks in 2008)***
- ***among them 9 exchanges of 48 weeks with Beyond Nanosil***
- ***15 cross-WP exchanges (60 weeks) ⇒ both exchange of knowledge and intensification of integration within Nanosil***

***59 exchanges (incl. 9 with beyond Nanosil) with total duration of 227 weeks (incl. 48 with beyond Nanosil) were done during the whole project.***



# Spreading of excellence

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## **DURING 2010-11**

### **□ Support of International Schools/Workshops**

- ✓ **4 calls were issued**
- ✓ **14 schools/workshops were supported (comparing with 5 during 2008 and 2009)**
  - **ULIS 2010, UK (10kE)**
  - **Silicon Nanowires Workshop, Belgium (750Euro),**
  - **SiGe Technology and device meeting, Sweden (2.5kE),**
  - **Workshop on Nanoscaled SemOI materials, sensors and devices, Belgium-Ukraine (11kE).**
  - **SINANO Summer School, Italy (14kE)**
  - **Simulation and characterization of statistical CMOS variability and reliability, Italy (2.5kE)**
  - **Graduate student meeting on electronic engineering JOINTLY with training course on Compact modelling, Spain (3.5kE)**
  - **MIGAS 2010, France (10kE)**
  - **Workshop on Carbon Electronics “EuroCarbon Symposium”, Germany (2.5kE)**
  - **SINANO-NANOSIL workshop “on the convergence between More Moore, More than Moore and beyond CMOS”, Spain (5kE)**
  - **Workshop “Nanoelectronics: a tool to face the future”, Spain (2.25kE)**
  - **Final Nanosil Workshop devoted to ENI2 “Nanoscale FET”, Ireland (4kE)**
  - **International conference “Micro&Nano”, Greece (2kE).**

# Spreading of excellence

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## **DURING 2010-11**

### **□ Organization of seminars/courses/workshops/tutorials/meetings**

*In additional to the above-mentioned, 14 events were organized w/o direct financial support of WP5 Nanosil funding:*

- ✓ **ESSDERC 2010** organized by UGR in September 2010;
- ✓ **EuroSOI Workshops** organized by INP-Grenoble & Leti in January 2010 and UGR in January 2011;
- ✓ **4 workshops / panel sessions within VP1.4 and 1 workshop organized within VP2.5**
- ✓ **ULIS 2011** organized by Tyndall-UCC;
- ✓ **Infos 2011** organized by INP-Grenoble;
- ✓ **academia-industry meetings;**
- ✓ **etc.**

### **□ New University Courses:**

**3 new University courses (total of 65 h)**

# Dissemination of knowledge

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## ***DURING 2010-11***

### ***□ Inside of NoE***

- ***E&SC meetings***
- ***Governing Board***
- ***Regular FPs/WPs meetings + cross-meetings***
- ***Exchanges/trainings***

### ***□ Beyond NoE***

- ***32 workshops/conferences/tutorial organized during 2010-11 by Nanosil partners (21 in 2009, 13 in 2008)***
- ***Nanosil “News Letter 2010-11” is finalized / available on the Nanosil site and will be distributed electronically to beyond Nanosil Institutions (particularly participated in national projects)***
- ***Web-site: widely accessible & restricted area***

# Web-site

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□ ***During 2010-11 we did regular update of the information available on our web-site:***

- ***national and EU projects;***
- ***list of joint Nanosil publications (with corresponding doi to ease the access);***
- ***breaking (or “hot”) news;***
- ***agenda of conferences/workshops/schools relevant to Nanosil fields;***
- ***list of workshops/schools supported (partially funded) by Nanosil;***
- ***open positions;***
- ***trainings/workshops available on the site of industrial (and semi-industrial) partners;***
- ***etc.***

# Dissemination of knowledge

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**DURING 2010-11**

## □ **Beyond NoE**

- **2 books** jointly edited by Nanosil partners

**“Nanoscale CMOS: Innovative materials, Modeling and Characterization”** is entirely devoted to the results obtained by the groups involved in Nanosil.

*It addresses all WPs of Nanosil and covers both processing and characterization/modelling aspects.*

*3 parts: materials, simulation methods, characterization; 17 chapters.*

*Issued in 2010.*

**“Semiconductor-on-Insulator Materials for nanoelectronics applications”** is published by SPRINGER in 2011 as a result of **SemOI Workshop** jointly organized by **UCL and ISP-Kiev** and financially supported by Nanosil. It goes a bit further in addressing “more than moore” and “beyond CMOS” fields. It groups selected keynote works in the four areas: 1° new semiconductor-on-insulator materials; 2° physics of modern SemOI devices; 3° diagnostics of the SOI devices; 4° sensors and MEMS on SOI. More than half of chapters in this book were prepared by Nanosil partners.

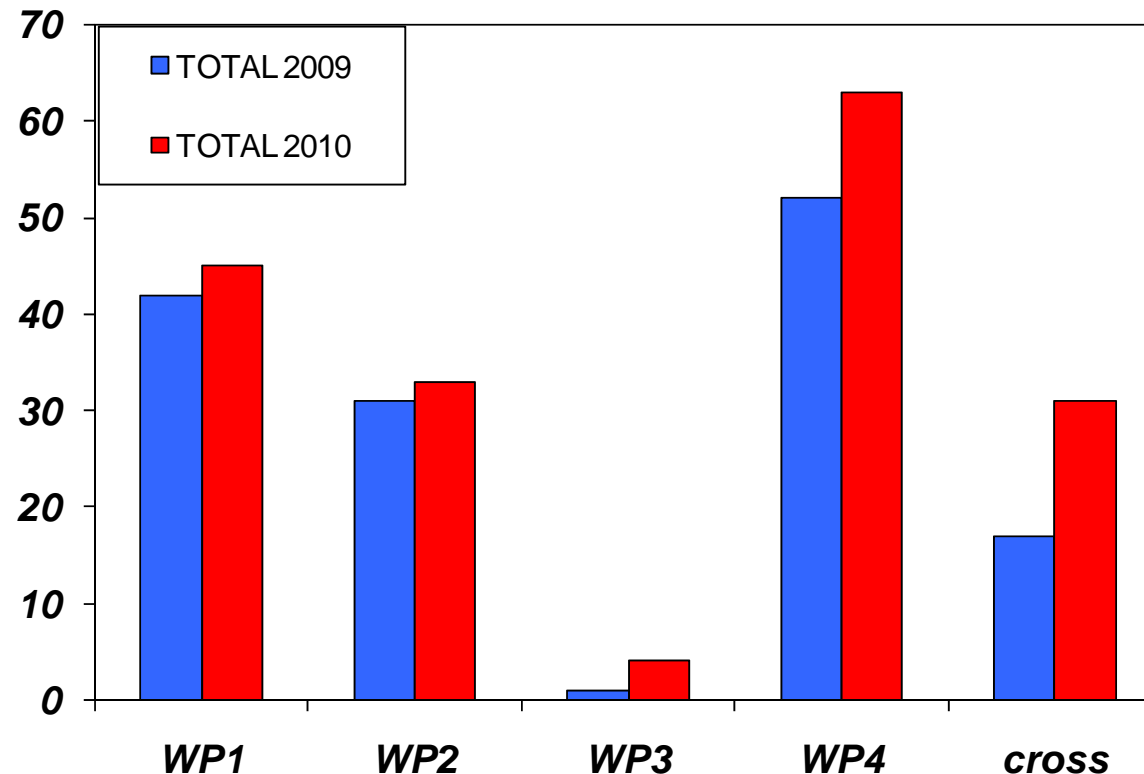
- **33 book chapters** (12 of them are joint)

# Dissemination of knowledge

**DURING 2010-11**

## □ *Beyond NoE*

- **Publication in high-level scientific journals:**  
*32 joint papers (among 98) were published; 8 joint papers (among 16) are accepted*



# Dissemination of knowledge

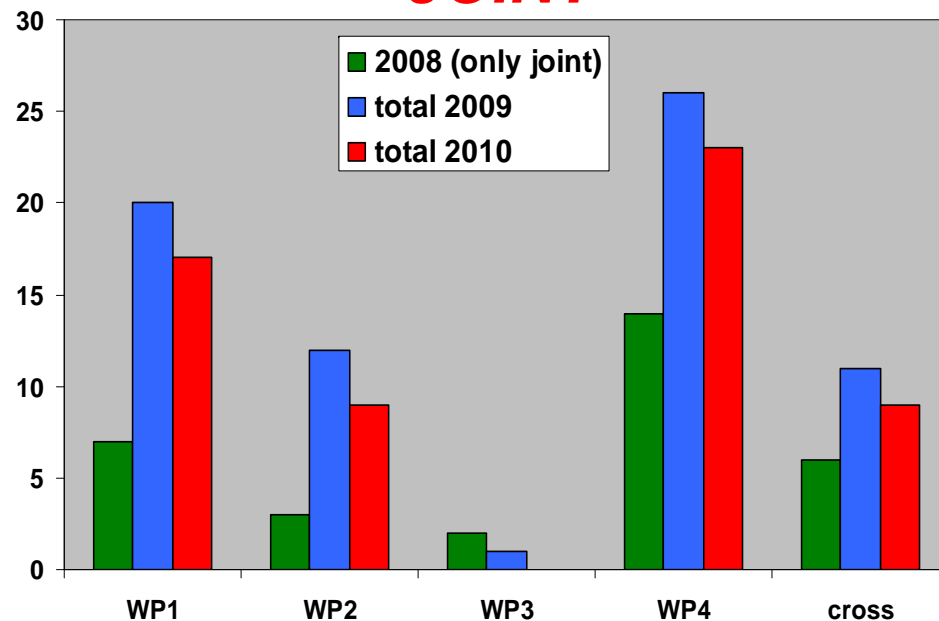
**DURING 2010-11**

## □ Beyond NoE

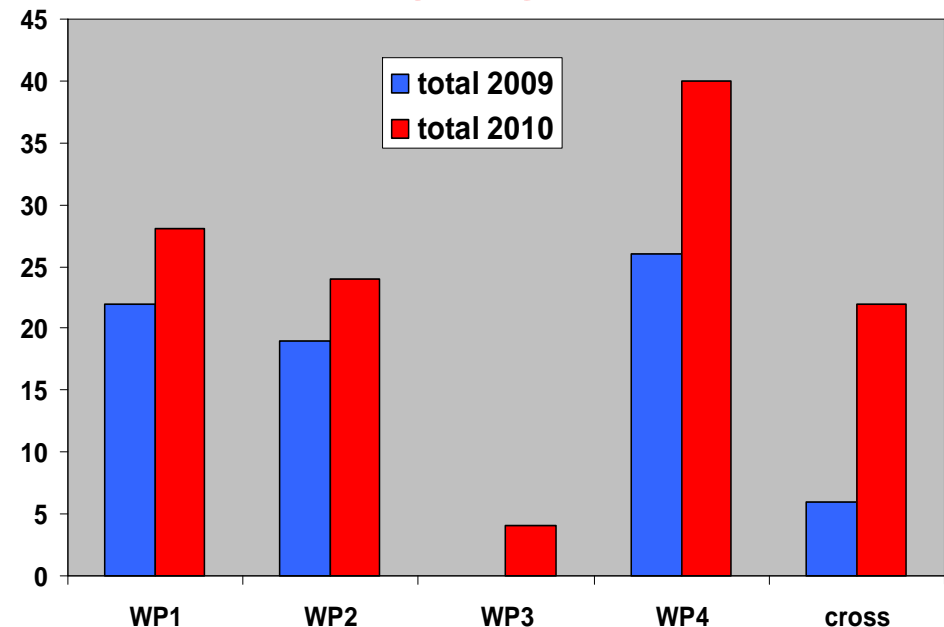
- **Publication in high-level scientific journals:**  
32 joint papers (among 98) were published; 8 joint papers (among 16) are accepted

**During the whole project: >100 joint papers and > 250 total**

## JOINT



## SINGLE



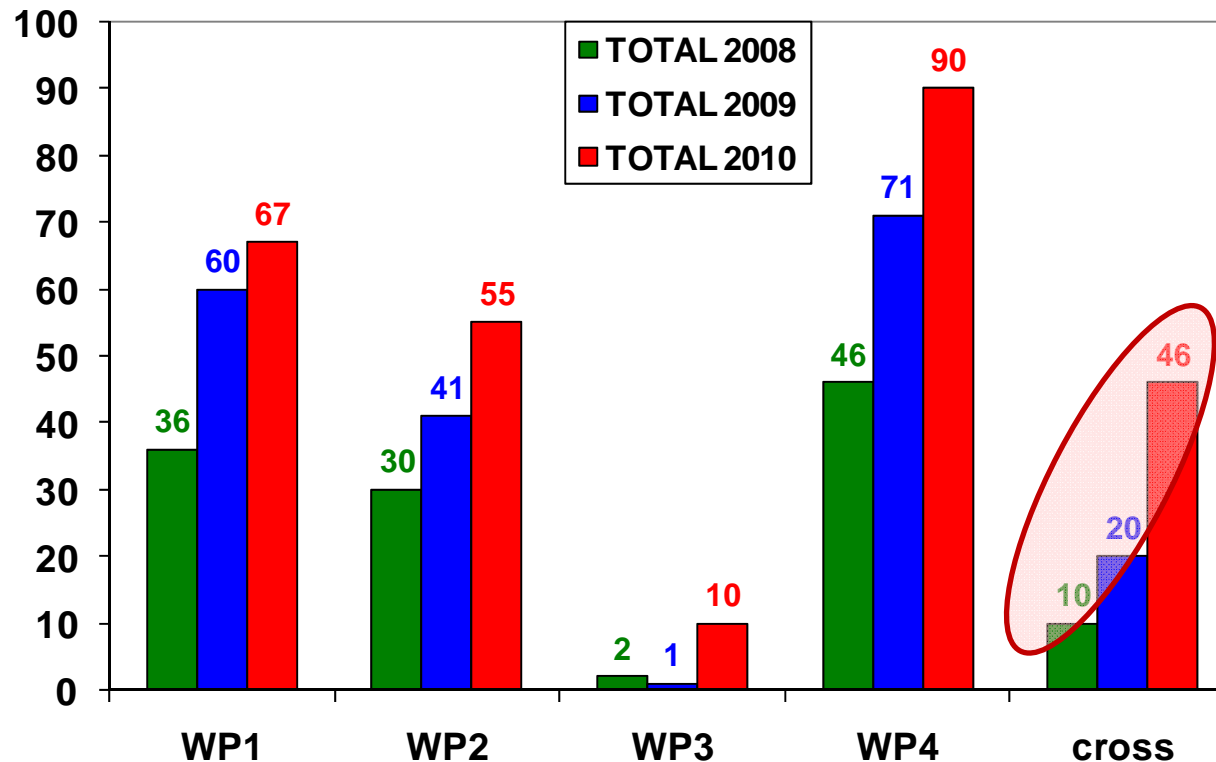
# Dissemination of knowledge

**DURING 2010-11**

## □ Beyond NoE

- **Presentations** at major international conferences: **165 conferences/workshops/tutorial presentations, 32 were invited (52 and 5 of them are joint, respectively)**

**During the whole project: >130 joint presentations and ~ 400 total**



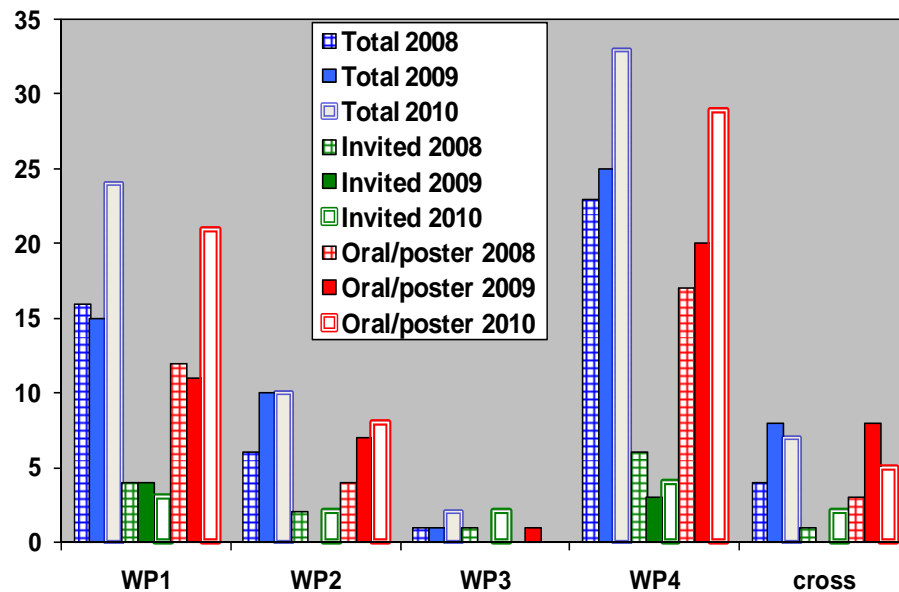
# Dissemination of knowledge

**DURING 2010-11**

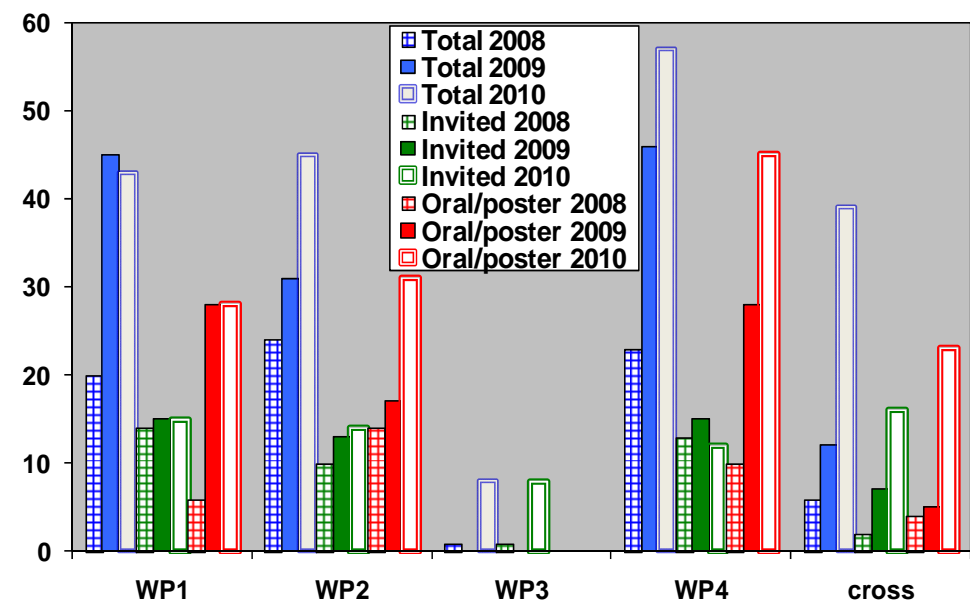
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**JOINT**



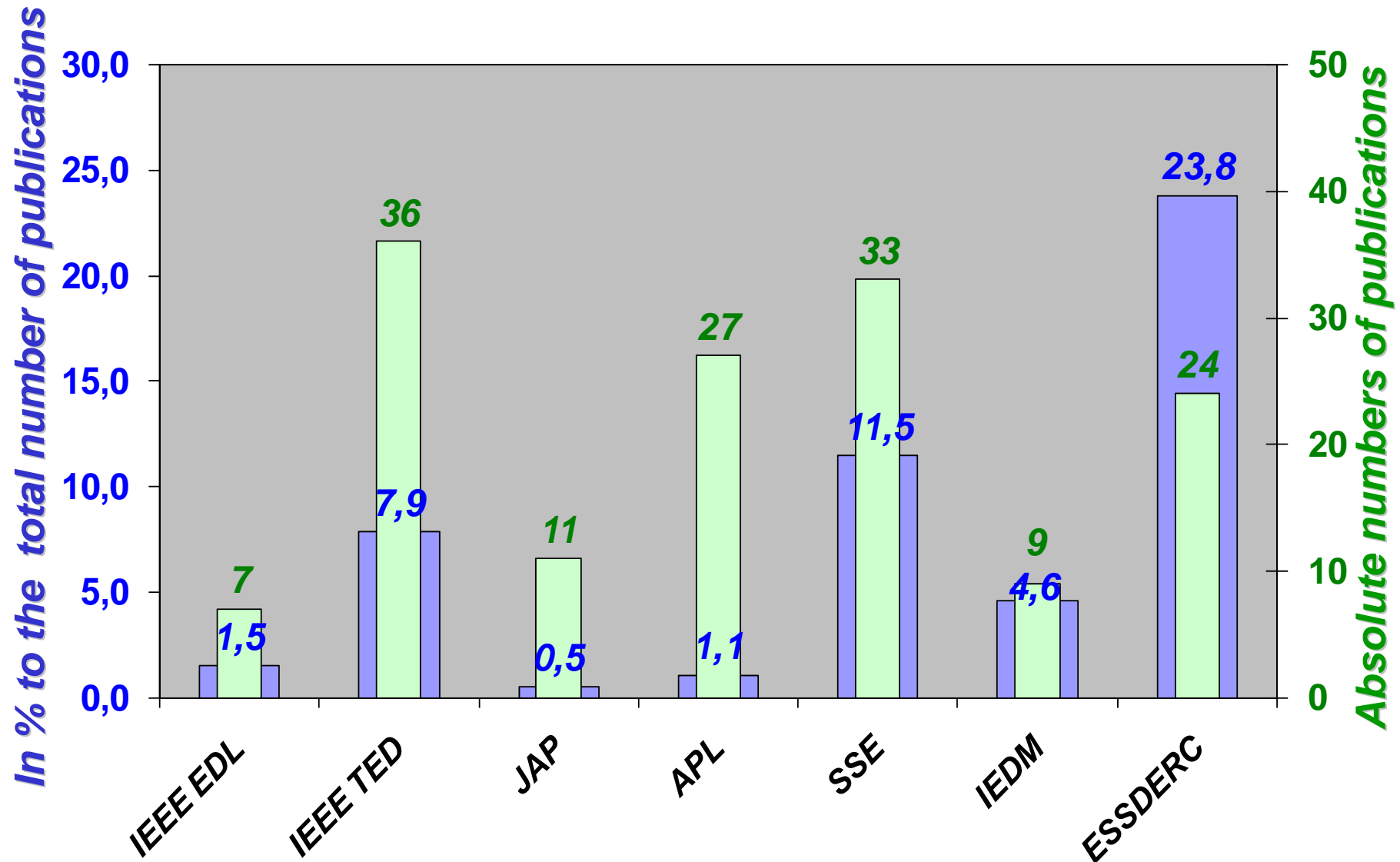
**SINGLE**



# Dissemination of knowledge

**DURING 2010-11**

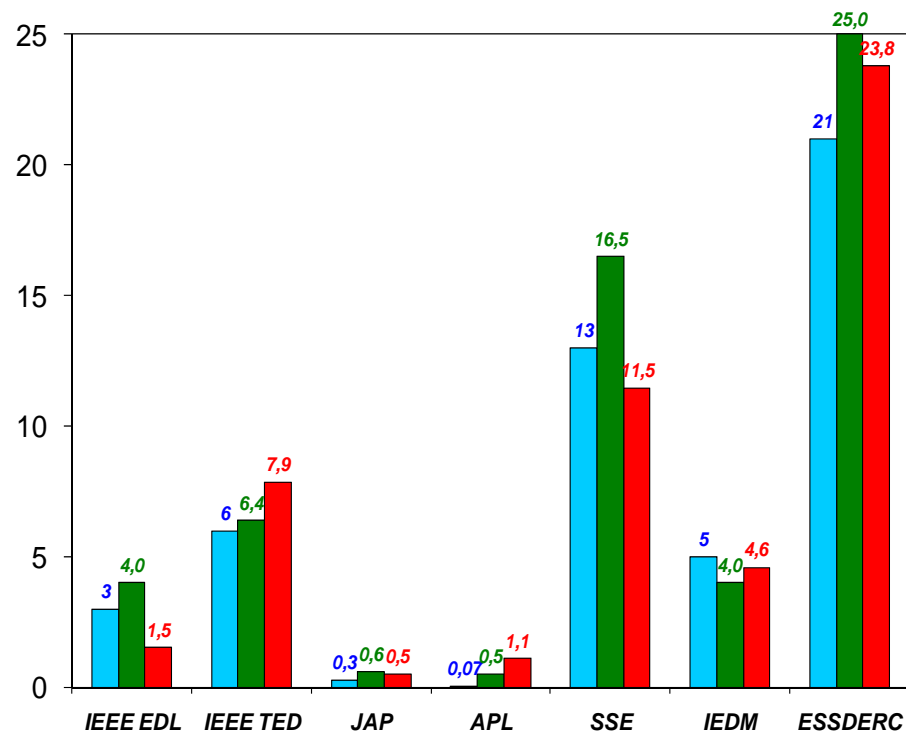
**Nanosil publications**



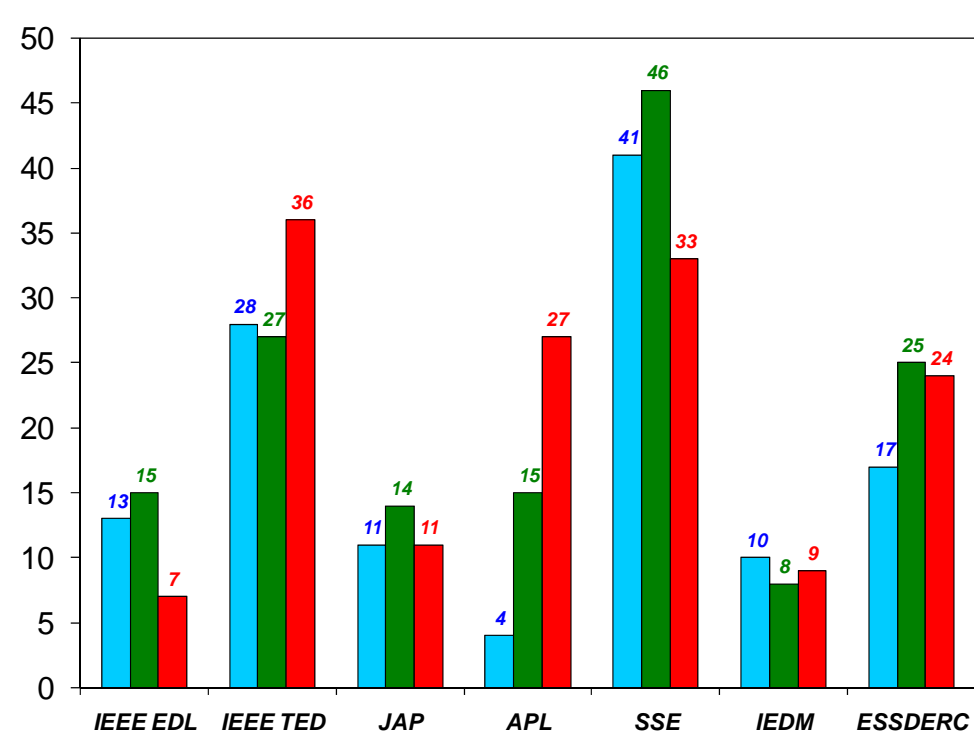
# Dissemination of knowledge

## *Nanosil publications* 2010 vs 2009 vs 2008

*In % to the total number  
of publications*



*Absolute numbers  
of publications*



# Durable integration

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- ❑ The Joint **Processing, Joint Characterization and Modelling Platforms** developed in Nanosil are now integrated as open Research Infrastructures in the Sinano Inst. and can be used by the European Academic Community, SMEs and Industry. The **movie** describing our platforms was realized in January 2011 to promote our available facilities and their accessibility to a wide scientific/industrial community.
- ❑ Nanosil Partners and Sinano Institute Members have been strongly associated to the new initiative launched in 2010 by STMicroelectronics **called ENI2 (European Nanoelectronics Infrastructure for Innovation)**. This Infrastructure (or in another words, eco-system) is proposed to coordinate the three levels of R&D activities needed in the nanoelectronics domain. Long-, medium- and short- term research levels are coordinated respectively by academia, institutes and industry.
- ❑ Number of **new projects involved two or more Nanosil partners** as e.g. FP7 NoE, Nanofunction, devoted to Beyond-CMOS nanodevices for adding functionalities to CMOS in the More than Moore domain (nanosensing, energy harvesting, nanocooling, RF); FET Flagship “Guardian Angels” proposal dedicated to future autonomous ultra low power systems for health and environmental monitoring (selected as a pilot project); FP7 STREPs STEEPER and SQWIRE, etc.
- ❑ **New members of Sinano Institute** (ICN-Barcelona, VTT-Helsinki, Twente University, IES-Montpellier University, IMS Demokritos-Athens, Uppsala University).

# Milestones & Deliverables

D5.1	“Annual review of integrating and spreading of excellence activities”	T0+12
D5.2	“Annual review of integrating and spreading of excellence activities”	T0+24
D5.3	“Annual review of integrating and spreading of excellence activities”	T0+39
D5.4	“Draft of multi-chapter multi-authors book”	T0+36

M5.1	“Who is Who guide”	T0+6
M?? (not included in the list)	Screening of national relevant projects	T0+6
M5.2-M5.11	“Call for exchanges and for courses/seminars/trainings”	T0+3 (each
<b><u>Last call was in September</u></b>		3 months)
M5.12	“Plan for strengthening the durable integration of the partners”	T0+36