



FUNDACIÓN “ PRO REBUS ACADEMIAE ”



R, D & I at the Department of Signal Theory and Communications, Universidad Carlos III de Madrid

**Magdalena Salazar Palma
Professor, Chairperson Dept. STC**

Jornadas RAI – CAE, 7-9/05/08



7-05-08

**M. Salazar
Palma**

Joint Seminar on Information and Communication Technologies, 7-9/05/08



Dept. Signal Theory & Communications



❑ Specialized knowledge on **multidisciplinary** fields:

- specific solutions
- comprehensive solutions

❑ Well recognized and experienced on leadership of projects at national, European & international levels

❑ Exceptionally good relations with numerous national and foreign companies and research centers



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Work force



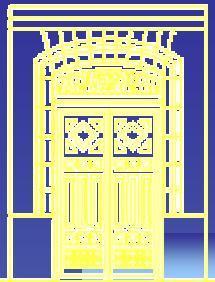
- **59 Faculty members** (3 FP + 23 AP + 5 Visiting P. + 14 Assistant P + 14 Part-time P) + **1 Researcher**
- **5 Technicians**
- **3 Management & Secretary Staff**
- **45 PhD Students**
- **72 Master Thesis Students**



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Research Groups



- Communications
- Radiofrequency
- Signal & data processing:
 - Information processing & management
 - Signal processing
 - Probabilistic methods for time series
- Multimedia processing



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Communications Group



□ Research lines:

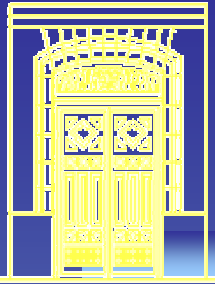
- Multiantenna (MIMO) systems for wideband communications
- OFDM multicarrier modulation
- Turbocoding
- Signal processing for digital communications
- Simulation & modeling of communication systems

□ Applications to: WLAN, WMAN, next generation mobile (4G) & satellite communication systems



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Radiofrequency Group



- Research lines:
 - High performance active antennas
 - Multiband & ultrawideband antennas
 - New technologies and materials (e.g., metamaterials) for antenna implementation
 - Numerical methods for analysis & design of passive components & antennas
 - Advanced synthesis methods for filters & multiplexers for space applications
- Applications to: mobile & satellite communications, radioastronomy (e.g., SKA), radar cross section, THz applications



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Information Processing & Management Group



□ Research lines:

- Neural networks / decision and estimation machines and ensembles
- Adaptive systems
- Emergent optimization



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□ Applications to: Signal processing, communications, decision support/data mining, text and web mining, information recovery and content management (push & pull)

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Signal Processing Group



□ Research lines:

- Detection & classification of signals & images
- Machine learning for signal & image processing
- Advanced adaptive signal processing techniques
- Information Theory applications

□ Applications to: communications, security, health



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Probabilistic Methods for Time Series Group



□ Research lines:

- Signal decomposition
- Signal prediction
- Bayesian methods for time series filtering
- Probabilistic methods in communications

□ Applications to: distributed processing, collaborative filtering, selective transmission & energy efficient routing in sensors networks; medium access control for body area networks; image & video distributed classification; content self configuration for P2P networks



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Multimedia Processing Group



□ Research lines:

- SVMs & Neural Networks for speech recognition, video coding & analysis
- Robust speech recognition
- Multimedia processing for mobile telephones and PDAs
- Image & video analysis & H.264/AVC video coding
- Automatic multimedia content extraction for information retrieval

□ Applications to: digital TV, human computer interaction, multimedia indexing & retrieval



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Infrastructure



- ❑ High Performance Computing Grid: 90 nodes, 288 cores, 2 storage servers (14 Terabytes), 2.7 Teraflops
- ❑ DSP platform for communication systems prototyping
- ❑ Anechoic chamber for antenna measurements and complete RF laboratory (up to 50 GHz) including hybrid circuits fabrication facilities
- ❑ Infrared images processing & recording equipment and video acquisition & reproduction hardware
- ❑ Acoustic anechoic chamber and acoustic acquisition, processing, storage & reproduction hardware



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Research Results (2007)



- ❑ 67 research projects and contracts
- ❑ 40 papers in scientific journals
- ❑ 9 books or book contributions
- ❑ 65 papers in International Conferences
- ❑ 12 stays of researchers in foreign Universities or Research Centers
- ❑ 6 PhD Thesis
- ❑ 72 Master Thesis



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Conclusions



- We have the work force
- We have the knowledge and experience
- We have the means
- We are always willing to learn more & start new research lines
- We can offer a good academic and research environment
- We are open to and willing to collaborate with Chinese Universities and Research Institutions



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Thanks!

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