



SASE 2017

SIMPOSIO ARGENTINO DE SISTEMAS EMBEBIDOS

09 | 10 | 11 DE AGOSTO

Workshops, tutoriales y conferencias plenarias | Congreso de trabajos científicos y pósters | Concurso de proyectos estudiantiles | Programa de equipamiento para universidades.

Actividades de formación sobre la CIAA.

Becas de alojamiento para estudiantes y docentes.

Introducción a los Sistemas Embebidos | Programación de Sistemas Embebidos | Fabricación de Sistemas Embebidos | Certificación de Sistemas Embebidos | Internet of Things | FPGA, HDL y ASICs | Bioingeniería | Linux Embebido | RTOS Real Time Op. Systems | Robótica e Inteligencia Artificial | Seguridad de la Información.

)) EMPRESAS AUSPICIANTES

DIAMOND: CIKA, ELECTROCOMPONENTES, SYNOPSYS.
PLATINUM: SEMAK
GOLD: CADIPEL, ERNESTO MAYER S.A., PROBATTERY, EMTECH, ASEMBLI, DAI ICHI CIRCUITOS, CLARIPHI, TELIT, VICDA.
SILVER: DIGI, UBIDOTS, L&R.

)) UNIVERSIDADES AUSPICIANTES

UNSA, UNT, UTM-FRT, UCSE, UNCA, UTM-FRLR, IUA, UBP, UCC, UNC, UTM-FRG, UNSJ, UNSL, UBA, UNCUYO, UTM-FRM, UNCOMA, UTM-FRN, UTM-FRPE, UNNE, UNAM, UTM-FRVT, UTM-FRVM, UNER, UTM-FRP, UTM-FRSF, UNRC, UTM-FRCU, UNL, UTM-FRSM, UNNOBA, UNAJ, UTM-FRD, UNLU, CAECE, ITBA, UADE, UBA, UNLAM, UNO, UNSAM, UNTREF, UTM-FRA, UTM-FRBA, UTM-FRH.

)) INSTITUCIONES

ORGANIZADORA: ACSE
CO-ORGANIZADORAS: RUSE
AUSPICIANTES: ANPCyT, CADIEEL, CAPER, CONICET, FUNDACIÓN SADOSKY, IEEE ARGENTINA, IEEE CASS, ISOC.
ACOMPAÑANTES: AAECA, ADIMRA, CAI, CAME, CAMOCA, CASEL, CEIL, CESSI, CIECCA (CNEA, CONFED), INTI, MinCyT, Red UIE, RUNIC.

SEDE DEL EVENTO: AV. PASEO COLÓN 850, BUENOS AIRES | FACULTAD DE INGENIERÍA UBA

ORGANIZA: ASOCIACIÓN CIVIL PARA LA INVESTIGACIÓN, PROMOCIÓN Y DESARROLLO DE LOS SISTEMAS ELECTRÓNICOS EMBEBIDOS.



www.sase.com.ar

General Report – SASE2017

The eighth edition of the Argentine Symposium on Embedded Systems, SASE2017, was held with great success from **August 9th to 11th, 2017 in Buenos Aires**, Argentina, on the premises of the Faculty of Engineering of the University of Buenos Aires.

The event **was organized by ACSE**, the Civil Association for the Research, Development and Advancement of Electronic Embedded Systems, in cooperation with Red Universitaria de Sistemas Embebidos (RUSE) and was sponsored by 16 companies, 24 institutions and 52 universities, which are listed at the end of this report.

A total of almost **1,100 people from different countries attended the SASE2017**, according to the distribution presented in Figure 1.

About 96% of attendees came from Argentina, while the remaining 7% was distributed among Mexico, Uruguay, Chile, Peru and Colombia.

Figure 2 shows the age distribution of those attending the SASE2017. Some significant data are as follows:

- 6% of participants less than 20 years old.
- 67% of participants between 20 and 30.
- 22% of participants between 30 and 50.
- 5% of the participants over 50.

It was observed that most of the participants came from academia, but the fraction of participants from industry is significant, as illustrated in Fig. 3.

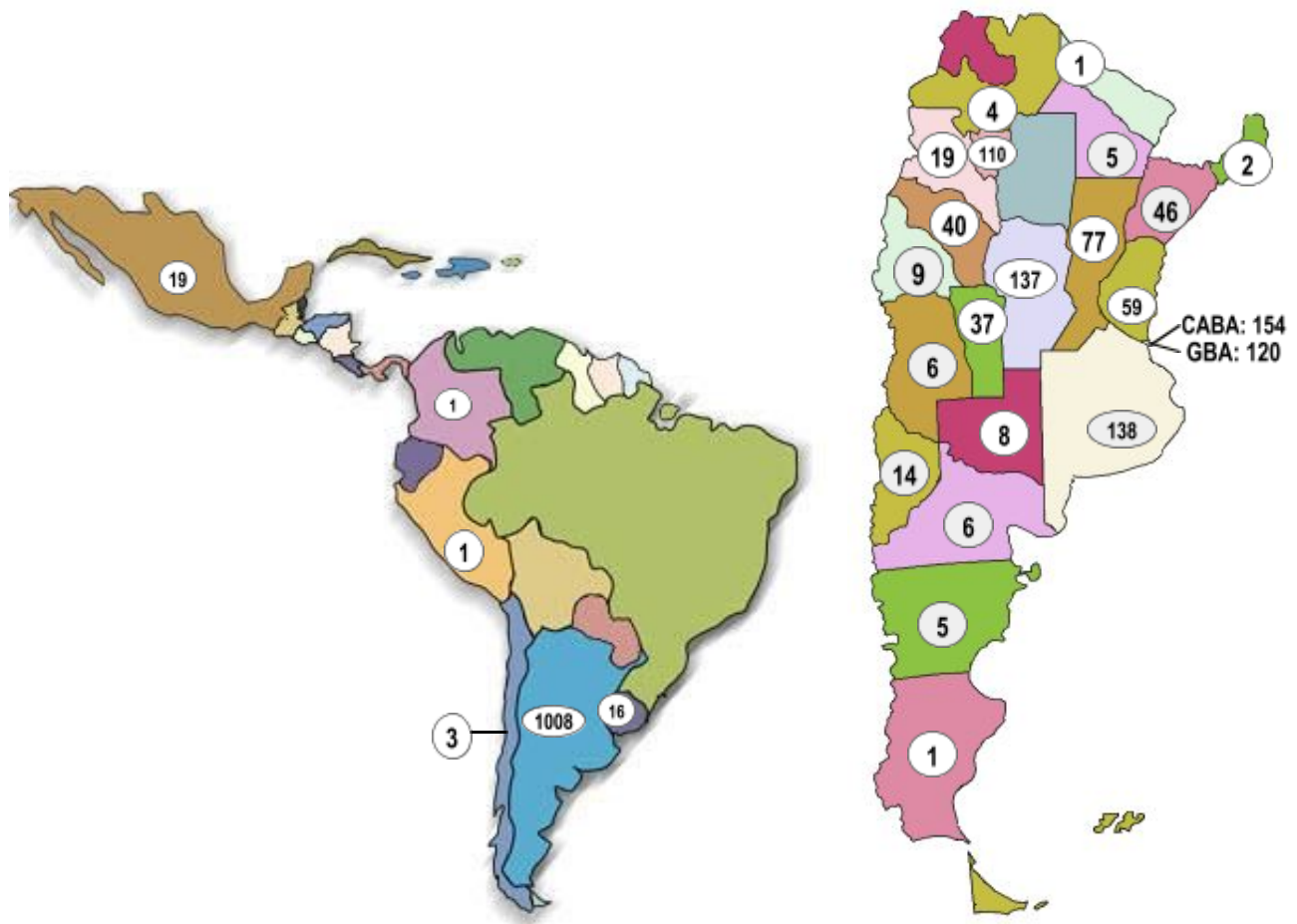


Fig. 1. Geographic origin of attendees to SASE2017.

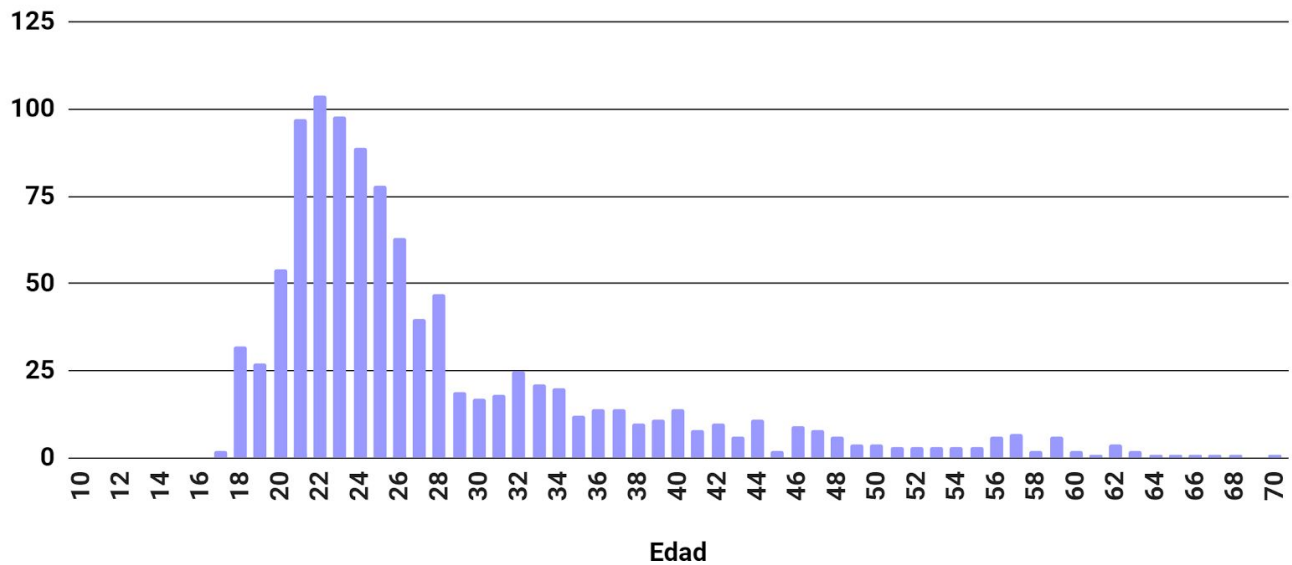


Fig. 2. Age distribution of attendees to SASE2017.

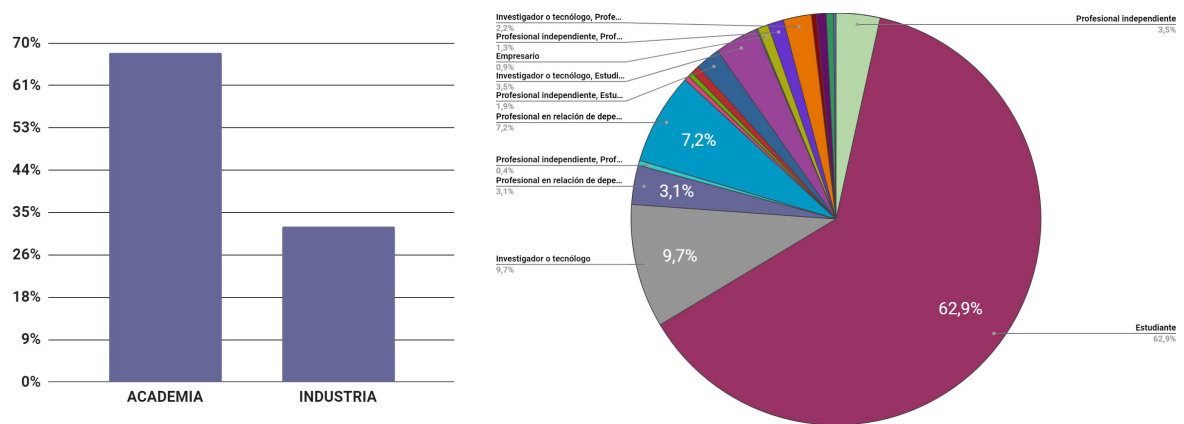


Fig. 3. Main occupation of attendees to SASE2017.

During SASE2017 **77 tutorials were held**, 90 minutes each, organized in 13 subject areas (Fig. 4, 5):

Subject	Number of tutorials	Enrolled participants (average)
Linux Embebido	11	83
Introducción a los Sistemas Embebidos	10	125
Programación de Sist. Embebidos	9	107
FPGAs, HDLs y ASICs	9	98
Internet de las Cosas	8	148
Certificación de Sistemas Embebidos	7	81
RTOS - Real Time Op. Systems	4	75
Fabricación de Sistemas Embebidos	4	137
CASE - Trabajos Distinguidos	4	53
Seguridad de la Información	4	76
Bioingeniería	3	201
Robótica e Inteligencia Artificial	3	141
Red RUSE	1	48

Fig. 4. Distribución de tutoriales por área temática en el SASE2017.



Fig. 5. Tutorials taking place during SASE2017

A Program for Travel and Accommodation Grants was also organized, aimed primarily at university students, although it also included faculty members from all over the country.

ACSE awarded **551 accommodation grants** totaling around \$ 352,000 (Argentine pesos), financing 30% of this amount with contributions from the CONICET and ANPCyT, and the other 70% by contributions from sponsoring companies (Figure 6).

Travel grants were also awarded, financed mainly by the universities themselves, who arranged for bus routes for their students and teachers (Fig. 6), and in smaller part by those attending the event, who also paid part of costs.

#	ENGINEERING SCHOOL	PROVINCE/COUNTRY	GRANTS GIVEN
1	UTN-FRBB	Bs. As.	7
2	UNS-DIEC	Bs. As.	11
3	UTN-FRSN	Bs. As.	18
4	UNMdP	Bs. As.	18
5	UNNOBA	Bs. As.	3
6	DCIC-UNS	Buenos Aires	6
7	UNCA	Catamarca	18
8	UTN FRR	Chaco	2
9	UNPSJB	Chubut	2
10	UTN-FRC	Córdoba	57
11	IUA	Córdoba	9
12	UNC	Córdoba	30
13	UNRC	Córdoba	5
14	UNNE FCENyA	Corrientes	40
15	UNER	Entre Ríos	53
16	UTN-FRP	Entre Ríos	4
17	UNLPm	La Pampa	6
18	UTN-FRLR	La Rioja	26
19	UTN-FRM	Mendoza	2
20	UTN-FRN	Neuquén	15
21	UNSJ	San Juan	10
22	UNSL	San Luis	38
23	UNR	Santa Fe	46
24	UNT -FaCEyT	Tucumán	52
25	UTN-FRT	Tucumán	54
26	FI-URU	Uruguay	18

Fig. 6. SASE2016 Program for Travel and Accommodation Grants

During SASE2017 there were 19 hand-on workshops, with a total of 340 seats, on the subject areas of “Introducción a los Sistemas Embebidos”, “Programación de Sistemas Embebidos”, “Internet de las cosas”, “FPGA y HDLs”, “RTOS”, “Linux Embebido” y “Gestión de Emprendimientos” (Fig. 7).

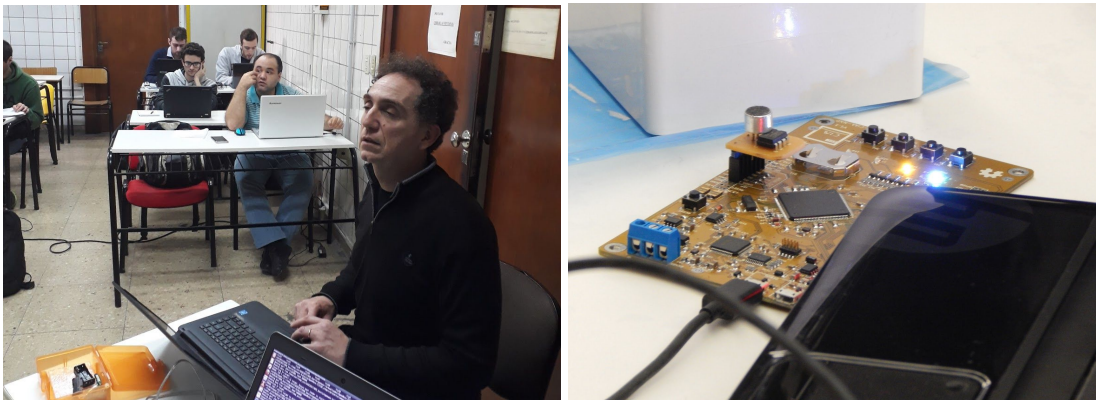


Fig. 7. Hands-on workshops held during SASE2017

In the scientific paper section of SASE, the **Argentine Congress on Embedded Systems, CASE2017**, 36 works were accepted in the categories of (1) regular papers, (2) technology forum, and (3) posters

Participation at **CASE2016** was **totally free**, and the selection was carried out using a double-blind peer review process and **the articles were published in two books** (Fig. 8), both with registered ISBN. In the case of the regular papers, they were included in the IEEE Xplore and several international databases (A&I, Abstracting and Indexing).

All the accepted articles were presented during CASE2017 Poster Sessions, and the authors of distinguished works from the categories regular papers and technology forum were invited to perform an oral presentation as part of the SASE2017 tutorials.



Fig. 8. Book covers of the Technology Forum and Posters Projects Book (left) and the Regular Papers book (right)

A **University Equipment Program** was implemented, by which more than 20 development kits and purchase orders for over \$50,000 (Argentine Pesos) were assigned to 17 universities:

Institution	Equipment
CeTAD – Universidad Nacional de La Plata	Telit - Kit EVK2 + Daughter Card de UL865
Universidad Tecnológica Nacional - Facultad Regional Córdoba	Telit - Kit EVK2 + Daughter Card de UL865
Universidad Nacional de la Patagonia San Juan Bosco	Telit - Kit de desarrollo de GPS SL869-DR
Universidad Tecnológica Nacional - Facultad Regional Mendoza	Telit - Kit de desarrollo de GPS SL869-DR
Universidad Nacional de Rosario	Digi XBee ZigBee Cloud Kit
Universidad Nacional del Nordeste	Digi ConnectCore 6UL Starter Kit
Universidad Nacional de Tucumán	Digi ConnectCore 6UL Development Kit
Instituto Universitario Aeronáutico, Córdoba	Holtek - Kit de desarrollo con MCU Cortex M3 HT32F1765
Universidad Nacional de Entre Ríos	Holtek - Kit de desarrollo con MCU Cortex M3 HT32F1765
Universidad Nacional de San Juan	Quectel - Módulo de comunicación celular 4G/LTE + GNSS (GPS y GLONASS)
Universidad Católica de Salta	Quectel - Módulo de comunicación celular 4G/LTE + GNSS (GPS y GLONASS)
Universidad Tecnológica Nacional – Facultad Regional Córdoba	Quectel - Módulo de comunicación celular 3G
Universidad Autónoma de Entre Ríos	Quectel - Módulo de comunicación celular 3G
Universidad Nacional de Río Cuarto	Quectel Kit GNSS (GPS + GLONASS) módulo L87
Universidad Tecnológica Nacional – Facultad Regional Bahía Blanca	Quectel Kit GNSS (GPS + GLONASS) módulo L87
Universidad Nacional de San Luis	Digi Kit Linux Jump Start Kit módulo 9C
Universidad Nacional del Sur	Digi Kit Linux Jump Start Kit módulo 9C
Poncho para la EDU-CIAA	Mayer / Assisi
Poncho para la EDU-CIAA	Dai Ichi
Poncho para la EDU-CIAA	Mayer

Fig. 8. Distribución de los recursos

In the final instance of the Student Project Contest in SASE2017 were presented 46 projects:

- Category A: **10** final university graduation projects.
- Category B: **24** university class projects.
- Category C: **5** high school class projects.
- Category CIAA: 7 CIAA projects

And the most outstanding projects received awards for a total of \$28,000 and 3 EDU-CIAAs (Fig. 9 and 10).

Cat.	Prize	University	Project
A	1er Prize (\$ 8.000)	UTN-FRT, Tucumán	Dispositivo electrónico para medición no invasiva de glucosa en sangre, Navarro R.,
	2do Prize (2 EDU-CIAA)	UTN-FRBB, Bahía Blanca	Trazador de curvas de Semiconductores, Leonhardt F.
B	1er Prize (\$ 6.000)	UNSJ, San Juan	Enlace IR-BFSK basado en FPGA, para uso didáctico, Diamantino M.
	2do Prize (2 EDU-CIAA)	UTN-FRA, Avellaneda	Sintetizador Digital de Audio con Filtro, Efectos y Comunicación por USB bajo LPCXpresso y FreeRTOS, Gómez Caamaño A.
C	1er Prize (\$ 4.000)	Instituto Don Orione, Tigre	DrumZZ - batería MIDI, Dieguez J., Zago M., Cepeda S., Garone F.
	2do Prize (1 EDU-CIAA)	Escuela Otto Krause, CABA	Sistema de Control de Timbres, Aguilar Rodriguez A., Churín G., Romero L. G.
CIAA	1er Prize (\$ 6.000)	FIUBA, CAB	Sistema de reconocimiento de palabras para la EDU-CIAA, Ávila Alterach G.
	2do Prize (\$ 4.000)	UNLP, La Plata	Port del Firmware CIAA para plataformas basadas en FPGA con softcore LEON 3, Puga G.

Fig. 9. Details of the winners of Student Project Contest in SASE2017

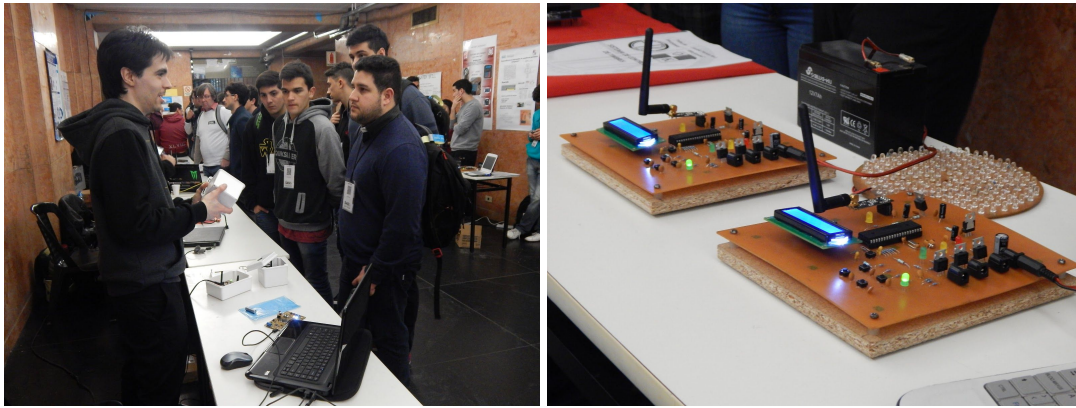


Fig. 10. Student Project Contest

The **Sponsors Hall** involved more than 300 m2 of facilities where, during three days, 17 companies and institutions presented their products and services to a very interested audience (Fig. 11)



Fig. 11. Sponsors Hall

One Plenary Sessions were held in SASE2017:

- Presentación de las Novedades del Proyecto CIAA (Ing. Pablo Ridolfi, UTN-FRBA/FRH, UBA)

The ninth edition of the Argentine Symposium of Embedded Systems, **SASE2018**, will be held between **August 8th and 10th in Buenos Aires**, in the University of Buenos Aires' Faculty of Engineering facilities.



Empresas Auspiciantes

Diamond



ELECTROCOMPONENTES S.A.

SYNOPSYS®

Platinum

SEMAK

Gold

ERNESTO MAYER S.A.
CIRCUITOS IMPRESOS

Silver



Institución Organizadora

ACSE (Asociación Civil para la Investigación, Promoción y Desarrollo de los Sistemas Electrónicos Embebidos)

Institución Co-organizadora

RUSE (Red Universitaria de Sistemas Embebidos del CONFEDI)

Instituciones Auspiciantes

- ANPCyT (Agencia Nacional de Promoción Científica y Tecnológica)
- CADIEEL (Cámara Argentina de Industrias Electrónicas, Electromecánicas y Luminotécnicas)
- CAPER (Cámara Argentina de Proveedores y Fabricantes de Equipos de Radiodifusión)
- CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas)
- FUNDACIÓN SADOSKY (Investigación y Desarrollo en TIC)
- IEEE ARGENTINA (Institute of Electrical and Electronics Engineers)
- IEEE CASS (Circuits and Systems Society)
- ISOC (Internet Society)

Instituciones Acompañantes

- AADECA (Asociación Argentina de Control Automático)
- ADIMRA (Asociación de Industriales Metalúrgicos de la República Argentina)
- CAI (Centro Argentino de Ingenieros)
- CAME (Confederación Argentina de la Mediana Empresa)
- CAMOCA (Cámara Argentina de Máquinas de Oficina, Comerciales y Afines)
- CASEL (Cámara Argentina de Seguridad Electrónica)
- CEIL (Cámara de Empresas Informáticas del Litoral)
- CESSI (Cámara de Empresas de Software y Servicios Informáticos)
- CIIECCA (Cámara de Industrias Informáticas, Electrónicas y de Comunicaciones del Centro de Argentina)
- CNEA ((Comisión Nacional de Energía Atómica))
- CONFEDI (Consejo Federal de Decanos de Ingeniería)
- INTI (Instituto Nacional de Tecnología Industrial)
- MinCyT (Ministerio de Ciencia, Tecnología e Innovación Productiva)
- Red UIE (Red Universitaria de Ingeniería en Electrónica)
- RUNIC (Red Universitaria de Ingeniería en Computación)



Universidades auspiciantes

