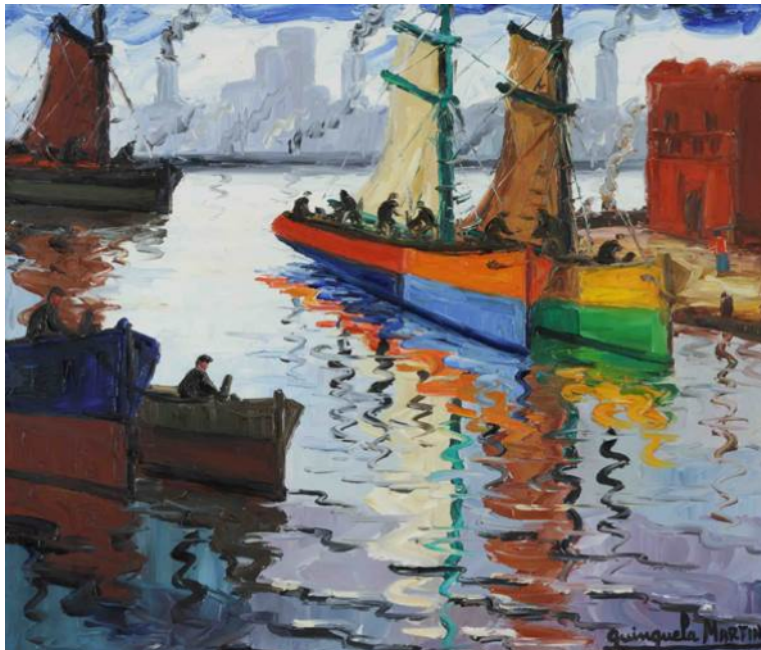
Three cases of applied science and engineering at work

Federico Izraelevitch
CNEA, CONICET, UNSAM



InterEST meeting
Polo Científico-Tecnológico, Buenos Aires
19-Mar-2019

Three cases of applied science and engineering at work

- Mid scale projects ~ 10 to 15 people.
- Cooperation between institutions.
  - Universities, Research Centers, Private Sector.
- Synergy between different disciplines.

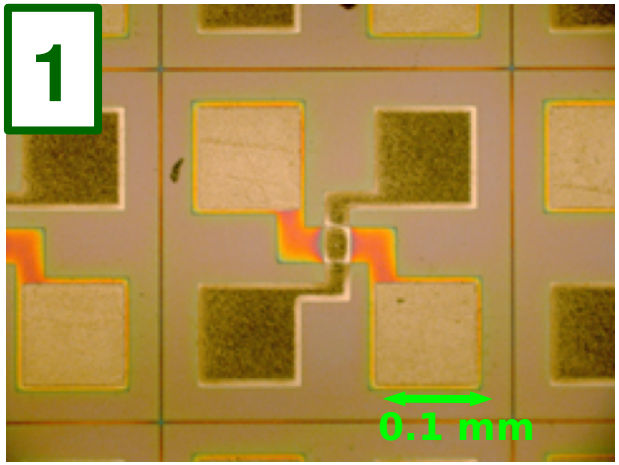
Address a **Specific issue**
and/or
Develop **Innovative** **cutting-edge Technology**.

Case 1: The LabOSat Project

- Objective: novel electronic components devices
  → Space applications.
- Platform to perform experiments on board of satellites.
- Increase the Technology Readiness Level.
  → Enable usage in future missions.
- Strong partnership with industry: Satellogic.

Case 1: The LabOSat Project

1



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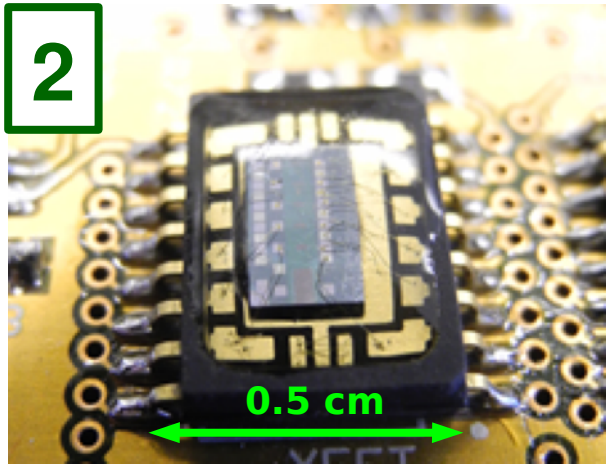

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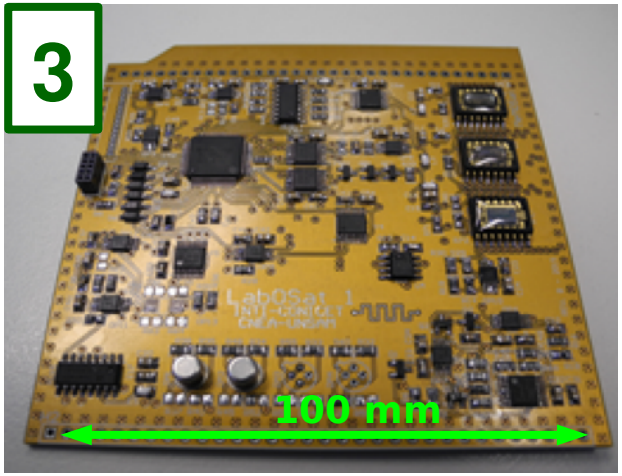

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Case 1: The LabOSat Project

- At the moment:
  → Seven platforms in orbit performing experiments.

- Components and devices:
  - Transistors.
  - Novel memories for data storage.
  - Sensors.

- Own components, commercial ones, and from partners:
  - External groups in Argentina
  - U. Turku (Finland)
  - Nanogune (Spain)
  - INL (Portugal)

Case 1: The LabOSat group (CNEA, CONICET, INTI, UBA, UNSAM)

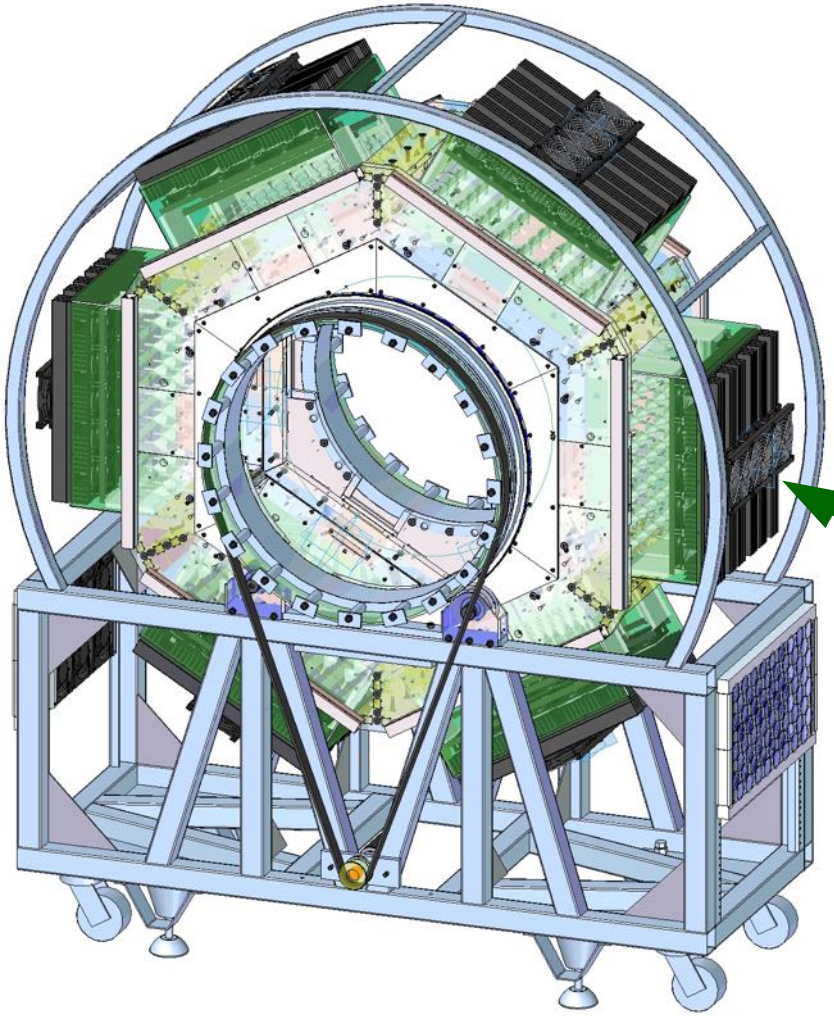
From left: Luciana Falcón, Mariano Barella, Fernando G. Marlasca, Federico Izraelevitch, Gabriel Sanca, Federico Golmar, Pablo Levy, Tomás Burroni, Iván Mercs, Tomás Chase, Irina Carsen, Lucas Finazzi.

Case 2: Development of a PET Scanner (positron emission tomograph) from scratch

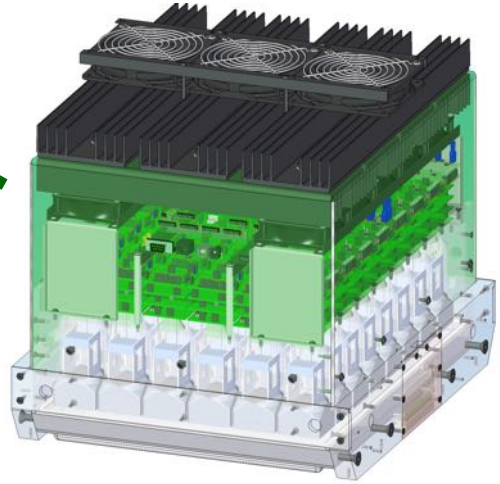
- Cost effective:
  - Less than half: production and installation.
  - Less than a quarter: maintenance.
- Can be repaired without going out-of-service.
- Average performance equipment (Not high-end).
- Broaden access to Nuclear Medicine.
- Seed grant from 

in 2006.

Case 2: The ArPET

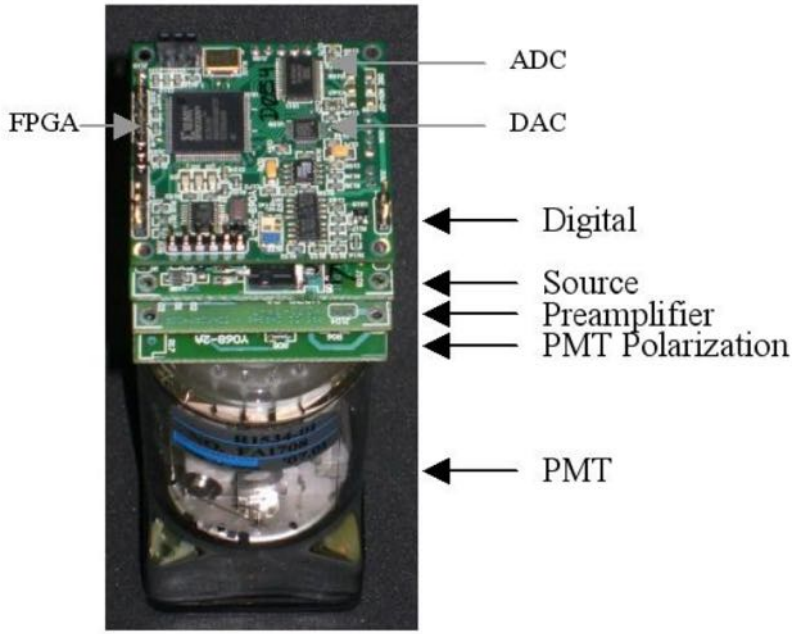


- Modular.
- Wireless.
- Self-cooling.
- Low-voltage powered.

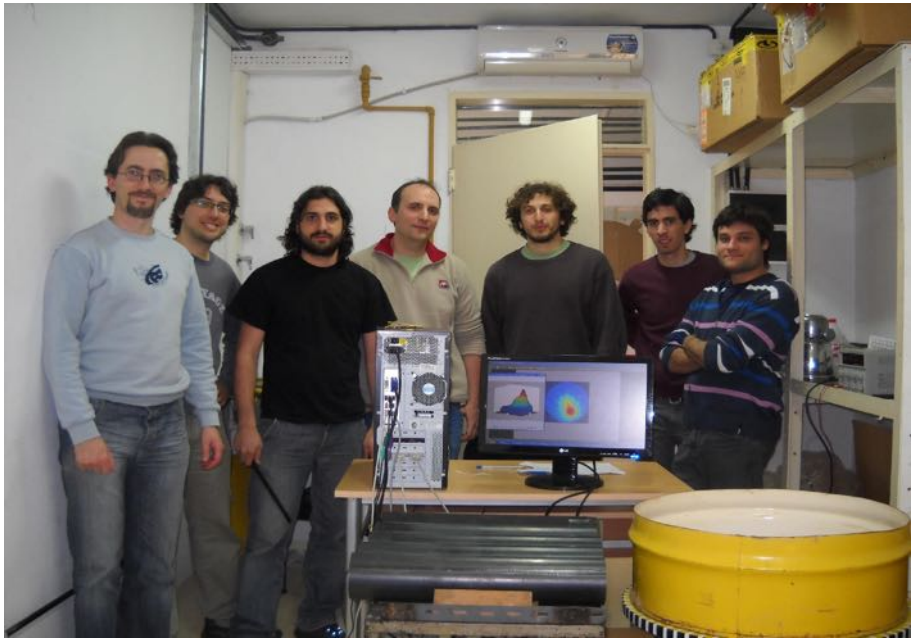


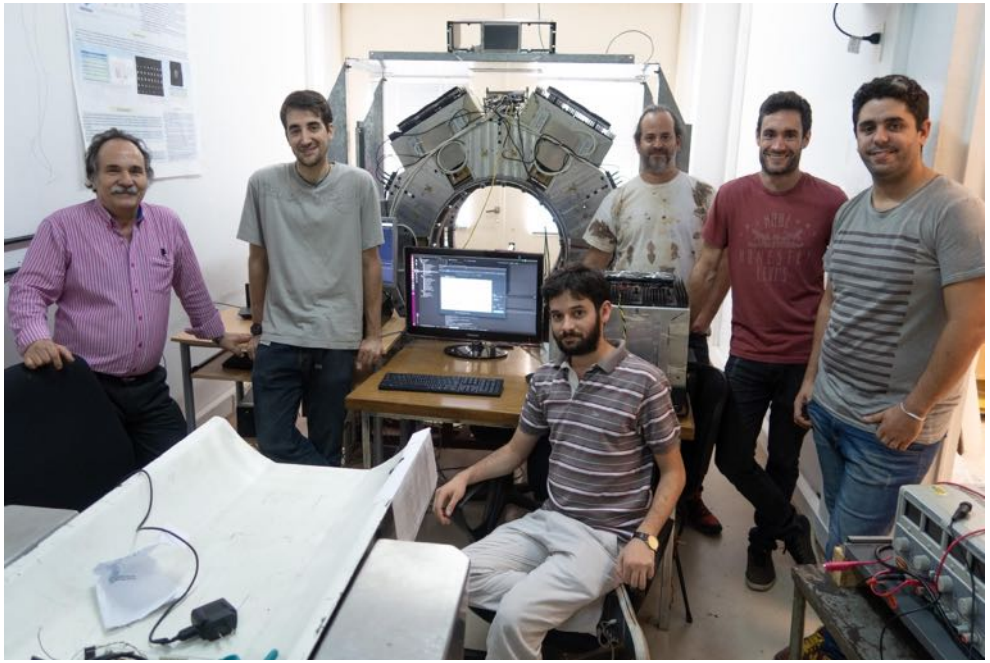
Head

Case 2: The ArPET



Case 2: The ArPET developer group (CNEA, UTN)





From left: Daniel Estryk, Augusto Carimato, Lucio Martínez Garbino, Juan Alarcón, Martín Belzunce, Esteban Venialgo, Elías da Ponte, Claudio A. Verrastro, Federico De La Cruz Arbizu, Flavio Bertolini, Daniel Minsky, Damián Pirlo, Ramiro Rodriguez Colmeiro.

About 10 more people: Medical Doctors, Medical Physicists, etc, (FCDN, UBA).

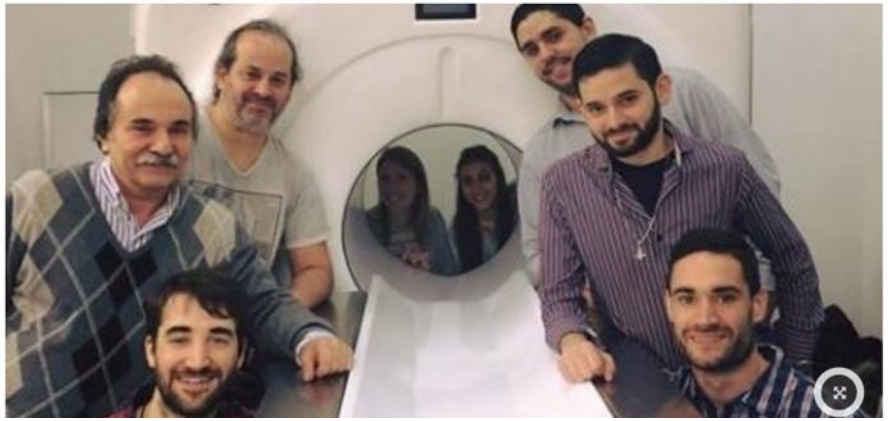
Case 2: The ArPET: installed at University of Buenos Aires Hospital

Clarín BUENA VIDA

Orgullo nacional

El primer tomógrafo fabricado en Argentina ya funciona en el Hospital de Clínicas

Dará diagnósticos precisos de cáncer y permitirá la detección temprana de problemas cardíacos y trastornos cerebrales.



LA NACION

Qué tiene de singular el primer tomógrafo diseñado en la Argentina

El costo de fabricación del tomógrafo ronda los 300 mil dólares Crédito: CNEA

Now: pursuing ANMAT approval to start diagnosing patients.

Case 3: Development of neutron detectors based on Lithium

- Shortage of Helium-3 (used for detectors in the past)
  - Byproduct of nuclear weapons production

- Argentina → one of the largest Lithium reserves

- Objective: develop Lithium neutron detectors as sensitive as Helium-3 ones.

- High value added to Lithium production.

Battery-grade lithium carbonate (Li_2CO_3)	→	10 US$/kg
Lithium compound in a battery (e.g. $LiMn_2O_4$)	→	60 US$/kg
Lithium in a neutron detector	→	3,000,000 US$/kg

Case 3: The LINT collaboration (CNEA, CONICET, UBA)

Horacio Corti, Gabriela Horwitz,
Andrés Cortes, Eduardo Fuentes

Ezequiel de la Llave,
Federico Viva

Aureliano Tartaglione

Emanuel Arévalo,
Federico Izraelevitch

Juan Valledor

Paula Curotto

Juan Alarcón

Case 3: The LINT collaboration (CNEA, CONICET, UBA)

Physical Chemistry
Electro Chemistry

Nano
technology

Physics

Physics
Electronics

Industrial
engineering

Chemistry

Electronics

Epilogue:
Three cases of applied science and engineering at work

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