Mission: Promote basic and applied research, specially in physics and industrial and technological development in Colombia and the Andean and Caribbean countries.

Objectives:
- Development of basic and applied research
- Scientists training
- Industrial technological development and innovation
- Introduction of new technologies in the country
- Creation of knowledge-based industries (spin offs)
CIF STRENGTHS

- High level and qualified basic research
- Experience in technological development
- Interdisciplinary professional team able to provide integrated solutions
- Administrative flexibility

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RESULTS SINCE 2000

- 80 technological products obtained through contracts with industry
- 3 spin-offs. 2 more in process
- 208 international and national publications
- 140 scientists trained:
  - 30 Ph.D
  - 40 MSc.
  - 70 Undergraduate - young researchers
- 36 R+D projects completed
- 2nd place among 60, in the last evaluation of research centers in Colombia
# ACIF-CIF Training (1985 - 2011)

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total events</td>
<td>215</td>
</tr>
<tr>
<td>Lecturers</td>
<td>1650</td>
</tr>
<tr>
<td>Local participants</td>
<td>8500</td>
</tr>
<tr>
<td>International participants</td>
<td>1800</td>
</tr>
</tbody>
</table>
Researchers training (1995 - 2011)
### Scientific Production (1995-2011)

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific papers</td>
<td>200</td>
</tr>
<tr>
<td>Proceedings</td>
<td>110</td>
</tr>
<tr>
<td>Books</td>
<td>7</td>
</tr>
<tr>
<td>Patents</td>
<td>5</td>
</tr>
</tbody>
</table>
## Production (1995-2011)

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finished projects</td>
<td>80</td>
</tr>
<tr>
<td>Technological Products</td>
<td>45</td>
</tr>
<tr>
<td>National Cooperation agreements</td>
<td>40</td>
</tr>
<tr>
<td>International cooperation agreements</td>
<td>30</td>
</tr>
</tbody>
</table>
**CIF TEAM - 2011**

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full time scientists</td>
<td>28</td>
</tr>
<tr>
<td>Part time scientists</td>
<td>11</td>
</tr>
<tr>
<td>Administrative</td>
<td>5</td>
</tr>
<tr>
<td>Management</td>
<td>4</td>
</tr>
<tr>
<td>PhD. MSc. And undergraduate students</td>
<td>40</td>
</tr>
<tr>
<td><strong>TOTAL CIF</strong></td>
<td><strong>88</strong></td>
</tr>
</tbody>
</table>
CIF’s GROUPS

BASIC RESEARCH
- Biophysics and membranes biology
- Optics
- Materials
- Nuclear Physics - U. Nacional

APPLIED RESEARCH AND TECHNOLOGICAL DEVELOPMENT
- Applied Physics and Tech. Development
- Biotechnology

PROJECT MANAGEMENT

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BIOPHYSICS AND MEMBRANE BIOLOGY

Director: PhD. Marcela Camacho

Main researchers: PhD. Clara Spinel, PhD. Enrico Nassi, PhD. Maria del Pilar Gómez
• Functional characterization of Leishmania ClC ion channel

• Membrane studies of the *Leishmania* parasitophorus vacuole

• *Leishmania* chloride channels, potential therapeutic target

• Melanopsin mediated transduction in unconventional photoreceptors
SOME RESULTS

• Theoretical Analysis of ion currents.

• Method to separate cells, intracellular organelles, etc.

• Membrane permeability in the model *Leishmania*-macrophage.

• Ion currents detected on the *Leishmania* parasitophorus vacuole.
NUCLEAR PHYSICS*

Director: PhD. Fernando Cristancho

- Nuclear structure
- Interaction of radiation with matter
- Applications of nuclear techniques to detection of “anti-personal mines”

*UNIVERSIDAD NACIONAL DE COLOMBIA
RESULTS AND NEW PROJECTS

- Study of the nuclear continuum at high intrinsic excitation energy and high spin.

- Applied nuclear physics developing devices able to locate buried objects using neutron and gamma backscattering techniques.

R&D Project on analysis and design of nuclear methods for detection of «anti-personal» mines. Stage II: development of field test prototype

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RESULTS 2010

MEASUREMENT OF MOISTURE IN SOIL AND MONITORING OF NANOPARTICLES

- Nanotechnology applications for agricultural purposes using colloids as a support for transportation of pesticides for plant protection

- Integrated Electrical Measurements of Soil designed to measure solute penetration and to know the percentage of moisture at the depth of irrigation from surface.

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ENVIROMENTAL BIOTECHNOLOGY

DEVELOPMENT AND SERVICES

- Bioremediation
- Cleanner production
- Agricultural Biotechnology
- Environmental Impact Assessments
- Health Security Environment
- Environmental Economy Analysis

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RESULTS - 2010

BIOFILTRATION SYSTEM

Hydrogen sulfide biofiltration system. Design, construction and monitoring

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Development of a Productive Reforestation Model

APRM

Flexible
Replicable
Low-cost model

High social and environmental impacts.
NEW PROJECTS - 2011

OPTIMIZATION OF SNAKE ANTI-VENOM SERUM PRODUCTION

- Processes optimization, Laboratorios Probiol S.A.
- Analysis and evaluation - productive chain
- Enhance ophidic accident treatment alternatives
NEW PROJECTS - 2011

Technical support to create a compensation fund and implementation of RSPO criteria in Aceites Manuelita SA plantation (Casanare - Orinoco grasslands)
NEW PROJECTS - 2011

Industrial sludge management - Spin off

Services of remediation and final disposition of two types of residues contaminated with hydrocarbons.
APPLIED PHYSICS AND TECHNOLOGICAL DEVELOPMENT

SERVICES

- Satellite Engineering
- Industrial instrumentation and automation
- Real time applications and data transmission
- Development of equipment for measuring and controlling processes
- Rational Use of Energy

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FUNDING OF TECHNOLOGICAL ACTIVITIES

1994-2000
Public sector

2000-2007
Industry
Public

2007-2011
Mainly Industry
Own funds
Spin-offs

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RESULTS

- Measuring and analysis equipment developed for the electrical sector
- More than 200 instruments produced and installed
- Technological solutions for Colombian industries
- Design of specialized electronic instrumentation and software
- Production of small series of devices
- Strengthening of the relationship with industry
- Research and development training
The Scan Power System was designed according to CREG Resolution 024-2005
METHANE GAS MEASUREMENT IN COAL SAMPLES - CANISTER

Automation of measurement systems with applications in mining and analysis of methane gas
COLOMBIAN EARTH OBSERVATION SATELLITE

Projects

- Satellite Earth Station
- Spectral radiometer
- Stage II: Topographical LIDAR

- Technical specifications
- Negotiation capacity
PROJECTIONS 2011

PRODUCTION
• Power Quality - Scan Power (2 projects)
• Telemetry (10 projects)
• Meterologic applications (FAC-5 projects)

DEVELOPMENT PROJECTS
• Inclination meter (ISA)
• High voltage line load meter (CODENSA)
• Meter test equipment (CODENSA)
• Telemetry (EPSA)

PLATFORM TECHNOLOGY
• Data Acquisition System
• Mesh Network Protocol
• RF communication protocol
• Embebed Linux Board Support package
• Power Line Communications

PLC
• Microcontroller AVR (8 and 32 bits)
• Scan Power Version FPGA
• Data analysis
• Electronic Design

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TELEMETRY SYSTEMS

Monitoring applications to measurement of:

• Energy, gas and water consumption
• River flows
• Oil and gas well production
• Others
CIF AND COLOMBIAN AIR FORCE (FAC) COOPERATION PROJECTS

Meteorological applications:

• Design of the Software SIMFAC v.2.0
• Earth Stations assembly (NOAA - GOES)
• Number modeling
• Meteorological Stations assembly
TECHNOLOGICAL-BASED INSTITUTIONS AND SPIN-OFFS

PROMOTED

- CIC. Corporación para la Investigación de la Corrosión - Corrosion research corporation -
- TECLASER. Use of laser in precision cuts
- AIDETEC. Electronic EQ production
- REXCO. Vacuum

NEW PROJECTS

- Sludge management services
- Energy analysis services (consumption and quality)
INTERNATIONAL COOPERATION

- COMSATS
- ICTP
- TWAS
- Max Planck Institute
- Ecole de Physique et Chimie, Paris
- Paris VI
- NWY, Biophysics Institute
- Woolshed
CIF has increased and strengthened its scientific and technological capabilities. This experience makes it easier to reach new fields for R+D in strategic areas for our country and the region.

Since we consider knowledge produced though R+D a key factor to development, therefore, our efforts are concentrated on the economic, environmental and social impacts derived from our activities.
NETWORKING

Association with 5 Centres with similar characteristics:
• Complementary research fields
• High scientific and technological level
• Regional location and international recognition