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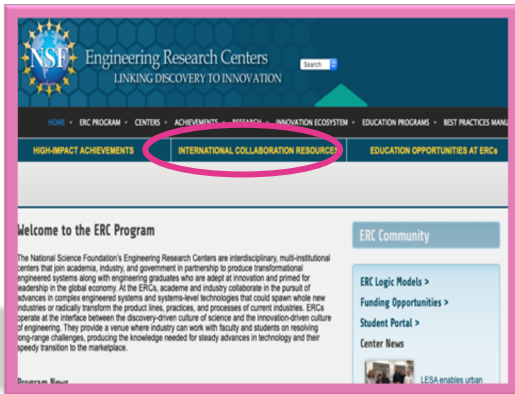
Outline

- ❖ Introduction
- ❖ NSF Office of International S&E
- ❖ Portal Origin (rom NSF-ERC & C2C)
- ❖ Demo of the Portal (your Feedback)
- ❖ Q&A

 International Research Collaboration Portal Pilot Webinar 

2

International Research Collaboration Portal



- A resource to facilitate international collaborations among engineering research centers and researchers
 - Portal will include information on current NSF opportunities for international research collaborations-**Office of International Science and Engineering (OISE)**
 - Information on international funding agencies and research centers.



3

Office of International Science & Engineering

Focal point for international science and engineering activities inside and outside NSF.

- International Representation
- Collaborations & Partnerships
- MULTIPLIER Missions & Embassy Science Fellows
- Data Analytics
- International Policies & Practices
- **Funding Programs**



4

OISE Funding Programs

International Research Experience for Students – IRES

Partnerships for International Research and Education - PIRE

Accelerating Research through International Network-to-Network Collaboration—AccelNet



5

Examples of other Collaboration Opportunities

• Dear Colleague Letters

- International Training and Education in Advanced Technologies (NSF 19-057)
- International Supplements in Chemistry (NSF 20-013)

• Formal Agency-to-Agency

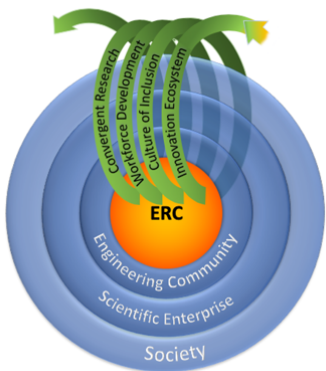
- Research Collaboration Opportunity in Europe (NSF 20-069)
- NSF-UK Research and Innovation (multiple)
- NSF-Israel Binational Science Foundation (NSF 17-020)

• Special Solicitations

- Ecology and Evolution of Infectious Diseases (NSF 19-592)
- Collaborative Research in Computational Neuroscience (NSF 18-591)
- Dimensions of Biodiversity (NSF 20-524)



6



Gen-4 ERC Program

- Four (4) Foundational Components
 1. Convergent Research
 2. Workforce Development
 3. Culture of Inclusion
 4. Innovation Ecosystem

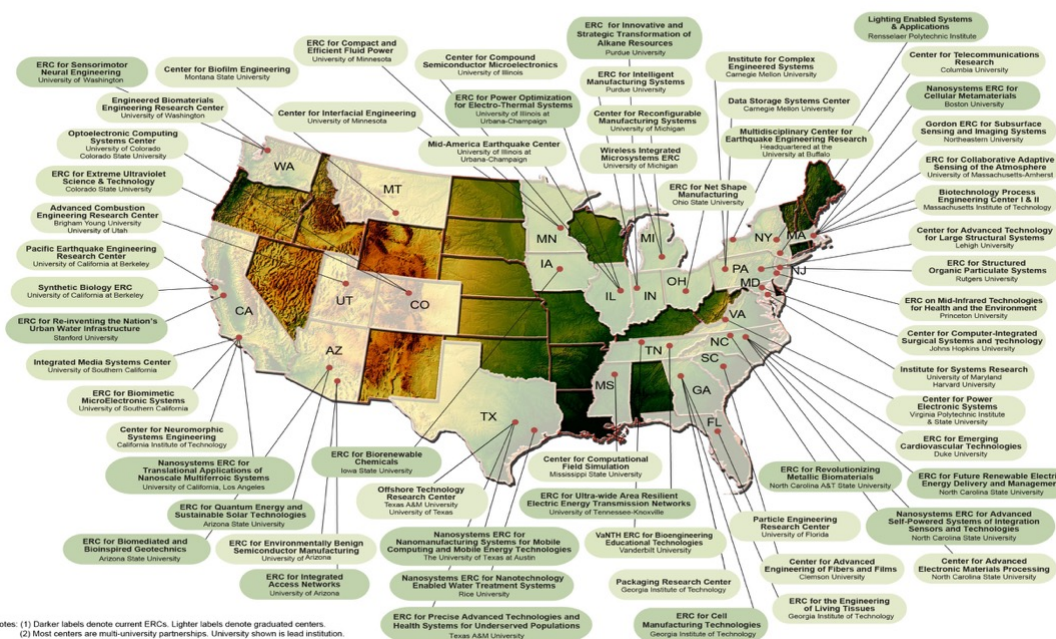
- ✓ Emphasis is to develop engineered systems, with high **societal impact**.
- ✓ Encourages **team formation, effective leadership/ management**, and the development and nurturing of **stakeholder communities**.

- Centers comprised of Lead institution plus Partner institutions, at least one MSI
- Awards: Up to \$60M for up to 10 years



7

Location of NSF ERC –Leads and Partners



8

ERC Center to Center (C2C) Mechanism:

C2C is a mechanism to **facilitate** international collaboration among 2 or more engineering or science research centers by means of a supplement.

- Each country or jurisdiction funds their own researchers, facilities, and/or students



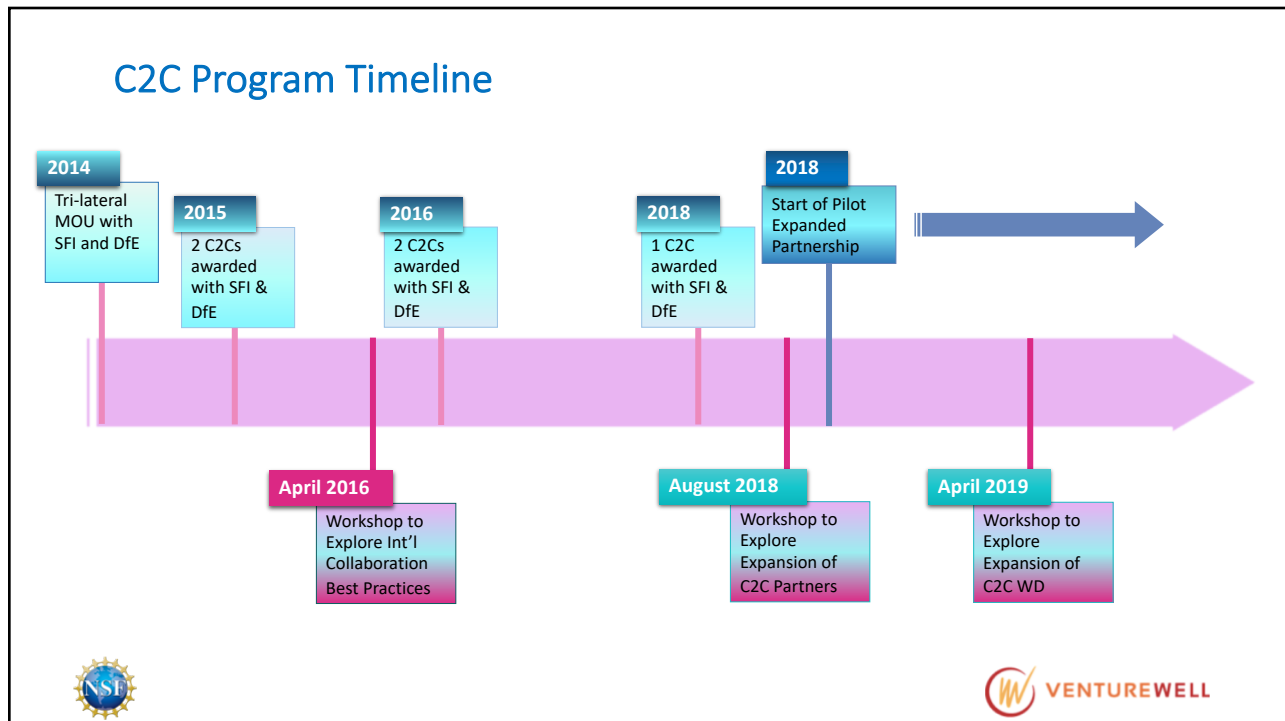
9

Return on Investment

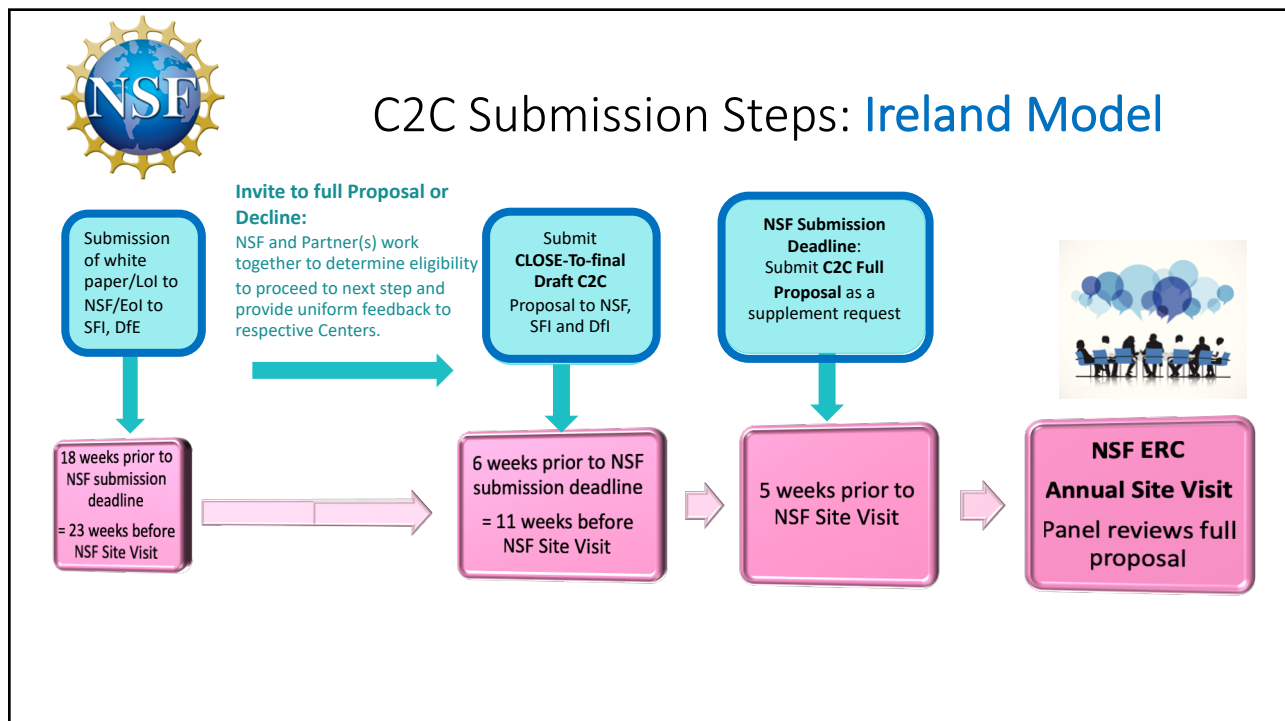
- ✓ Accelerates achievement of milestones
- ✓ Augment existing capabilities of ERC's
- ✓ Share expertise and infrastructure
- ✓ Train graduate students and/or Postdocs
- ✓ Enhance engagement with industry
- ✓ Embrace convergent research to solve significant research goals and



10



11



12

Lists of previous NSF ERC C2C projects

International Collaborations and Engineering Research Centers (ERCs): The Center-to-Center Mechanism

The objectives of C2C collaborations are to:

- Augment existing capabilities of ERC's
- Share expertise and infrastructure
- Train graduate students and/or Postdocs
- Enhance engagement with industry
- Embrace convergent research to solve significant research goals and challenges
- Accelerate achievement of milestones at fundamental, enabling technology and/or testbed levels
- Facilitate achieving the ERC vision in scope, scale, and/or impact

C2C partners achieve their goals through collaborative research projects in which funding agencies fund the elements of research undertaken in their own jurisdiction. The mechanism of the partnership is based on a memorandum of understanding signed by the agencies involved. Examples of past and currently funded C2C collaborations, and participating funding bodies, include:

- Agile Cloud Service Delivery using Integrated Photonics Networking
 - Centre for Integrated Access Networks (CIAN) - NSF
 - CONNECT and Irish Photonic Integration Centre - SFI
 - Computer Science Research Institute (CSRI) - DfE
- Energy and the Environment: Data-driven Reliability of Carbon-based Energy Conversion, Capture and Storage Systems
 - ERC for Power Optimization for Electro-Thermal Systems (POETS) - NSF
 - Research Center for Gas Innovation (RCGI) - FAPESP
- Partnership in continuous manufacturing methods for nano-based drug delivery platforms
 - Centre for Structured Organic Particulate (CSOPS) - NSF
 - Synthesis and Solid-State Pharmaceutical Cluster (SSPC) - SFI
 - Centre of Pharmaceutical Sciences - DfE
- Ultra-low Energy Electric Field Control of Non-volatile Magnetoelectric Memory Devices
 - Nanosystems Engineering Research Centre - NSF
 - Advanced Materials and Bio-Engineering Research (AMBER) - SFI
 - Centre for Nanostructured Media (CNM) - DfE
- Collaborative REsearch of Decentralised Electrification Communications and Economics (CREDECENCE)
 - Centre for Future Renewable Electric Energy Delivery and Management Systems (FREEDM) - NSF
 - Centre for Marine and Renewable Energy (MaREI) - SFI
 - Energy, Power and Intelligent Control (EPIC) - DfE
- Bioresorbable Magnesium Alloy Systems for the Promotion of Regenerative Biological Function in Orthopaedic Implant Devices
 - Centre for Revolutionizing Metallic Biomaterials (RMB) - NSF
 - Centre for Research in Medical Devices (CURAM) - SFI
 - Nanotechnology and Integrated Bioengineering Centre (NIREC) - DfE



13

CIAN-CONNECT-IPIC-CSRI Agile Cloud

- Setup signals across autonomous domains
- Use SI Photonics/integrated phot. switches
- Optical Circuit Switching & OPM

Multiferroic Elements

Legend: IEM: Intelligent Energy Management, IFM: Intelligent Fault Management, DRER: Distributed Renewable Energy Resource, DESD: Distributed Energy Storage Device

Figure #1. Schematics of emissions bio-sensed reaction systems.

US-Ireland R&D agree joint partnership on nano-based pharma drugs research

22 March 2016

A tripartite US-Ireland R&D partnership announced in Washington DC by SFI to celebrate scientific collaboration between Ireland and the US

14

NSF-ERC/VentureWell Partnership for International Collaboration

Objectives:

- Increase and enhance impacts of engineering research
- Explore **support** of meaningful international center-to-center collaboration
- Identify best practices for international collaboration
- Develop opportunities for collaborative learning and relationship building among stakeholders



15

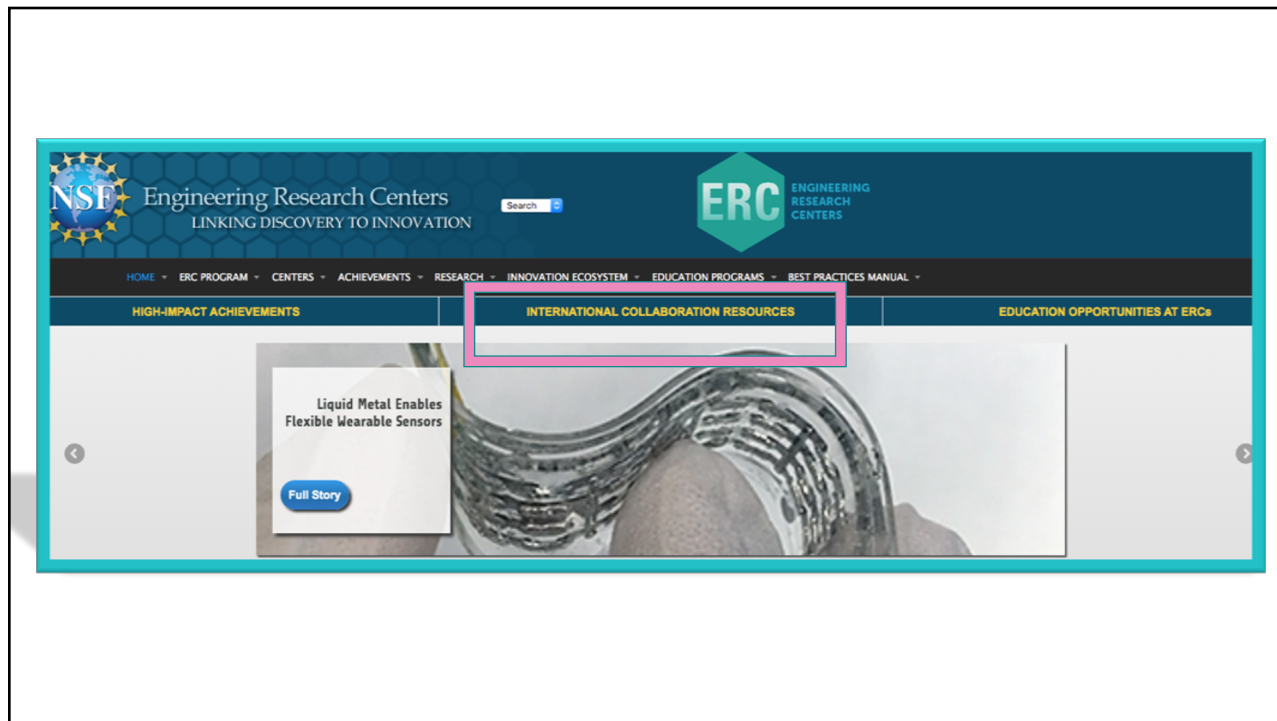
NSF-ERC/VentureWell Partnership for International Collaboration

Activities:

1. ERC C2C Collaboration Workshop (August 2018)
2. ERC Workshop on Int'l Collaborations to Enhance Workforce Development (April 2019)
3. erc-assoc.org International Collaboration Portal (Spring/Summer 2020)



16



17



18

Home / Research / Welcome to the Portal for International Collaboration Resources!

Welcome to the Portal for International Collaboration Resources!

From the U.S. National Science Foundation (NSF) Engineering Research Centers (ERCs)

International research collaborations help advance the frontiers of science and engineering. These types of collaborations are also vital in preparing a globally engaged US science and engineering (S&E) workforce. [International collaborations](#) represent an opportunity for the US National Science Foundation (NSF) Engineering Research Centers (ERCs) to:

- Gain access to unique expertise, facilities, workforces, and phenomena
- Leverage limited resources
- Exchange insights and techniques
- Address national, transnational, and global challenges
- Nurture capable young researchers with strong networks overseas
- Develop global perspectives in the US S&E workforce
- Facilitate mobility and talent circulation globally.

The [Center-to-Center \(C2C\) mechanism](#) provides limited supplemental funding for active ERCs to engage in this type of international collaboration. The C2C mechanism represents one of several [strategic opportunities](#) for research collaboration between ERCs and global partners to advance knowledge and benefit society across international boundaries.

To facilitate the engagement of ERCs with international collaborators, and to provide a gateway for research centers world-wide, NSF partnered with VentureWell to develop a portal of resources to support these international collaborations. NSF supports the U.S. side of international collaboration. It is expected that foreign organizations will provide support for their researchers and/or centers.





WHY INTERNATIONAL COLLABORATION?



INTERNATIONAL RESEARCH CENTER SEARCH



FUNDING AGENCY SEARCH

19

Building the Resources

1) Rationale:

How can international collaborations add value to an ERC's intellectual merit and broader impacts?

Convergent
Research and Team
Science



Engineering
Workforce
Development

Diversity and
Culture of Inclusion

Innovation
Ecosystem

Aim: to provide language for ERCs to connect the dots between integral components of the ERC and international collaborations

Method: Review journal articles, reports, whitepapers, past convenings and collect highlights in single brief for public reference

20

Home / ERCs and International Collaboration Rationale

ERCs and International Collaboration Rationale


Executive Summary

Governments around the world are promoting scientific collaboration and mobility by implementing policies and designing programs to foster international cooperation (OECD 2012; European Commission 2012; Jacob and Meek 2013; Wagner et al. 2018). This trend can be attributed to the significant benefits that accrue from international collaboration at the research system, institutional, and individual level (Royal Society, 2011). Examples of such benefits include:

- Access to talent, research expertise and resources around a particular topic
- Effective tackling of global societal challenges
- Cost sharing, risk reduction in infrastructure investments, and greater research scale
- Establishment of new opportunities for industry through participation in global value chains and access to new and emerging markets
- Increase in reach and impact of research funding
- Having a voice in global debates and developments around research and innovation
- Enhance workforce development through the formation of global networks of mobile, interculturally competent engineers

Brief rationale statements (and associated resources where appropriate) have been collected to show how international collaborations could add value to an NSF-supported ERC across its foundational components, including (link to each longer text):

Convergent Research and Team Science:	The deeply collaborative, team-based approach of convergent research, partnered with the trend of internationalization in science, means a necessary intensification of international communication and exchange among scientists. For the U.S. to remain a center of innovation as centers of academic production spread throughout the world, scientists and engineers must develop the team science capabilities necessary to work across differences towards solving the greatest engineering challenges of the 21st century and beyond. International collaborations build the experience and capabilities ERCs need to stay on the cutting edge of innovation. (learn more)
Engineering Workforce Development:	Through international collaborations, the ERC program enables the formation of global networks of interculturally competent and academically mobile engineers. The rich experiences that both ERC faculty and students gain from experience working across international boundaries, then bring back to the ERC to share their learnings with others, represent a significant opportunity to improve workforce development outcomes for ERCs. (learn more)
Diversity and Culture of Inclusion:	The relationships and intercultural skills developed through international collaborations, as well as the opportunities these collaborations represent to reconstruct existing paradigms of access to prestigious research experiences, help to foster the development of an inclusive engineering workforce. This workforce will be necessary to address the complex problems with worldwide societal impacts facing today's engineers, while maintaining US competitive, and collaborative, advantage. (learn more)
Innovation Ecosystem:	Each ERC has a network of partners that work together to create and enhance the capacity for innovation and develop new ways for delivering value with positive societal impact. Bringing international collaborators into the ERC's innovation ecosystem provides access to globally dispersed knowledge networks, expertise, capital, customers, and shared challenges to solve. (learn more)



21

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WHY INTERNATIONAL COLLABORATION?



INTERNATIONAL RESEARCH CENTER SEARCH



FUNDING AGENCY SEARCH



22

Building the Resources

2) Database of Centers and Funding Agencies:

- Outreach to ~100 funding agencies and international funding bodies, plus web scraping
- Collected information on international engineering centers:
 - Center and point-of-contact information
 - Research topics
 - Facilities available
 - Primary language
 - Partner organizations
 - Funding body
- **Outcome:** 213 Engineering Centers across 72 countries listed in database as of today



23

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24

Demo

The screenshot shows the Engineering Research Centers (ERC) website. The main header includes the NSF logo and the text "Engineering Research Centers LINKING DISCOVERY TO INNOVATION". Below the header are navigation tabs for "HOME", "ERC PROGRAM", "CENTERS", "ACHIEVEMENTS", "RESEARCH", "INNOVATION ECOSYSTEM", and "EDUCATION PROGRAM". A search bar is located in the top right.

Overlaid on the website are several informational pop-ups:

- ERC Community**: A section titled "Welcome to the ERC Program" explaining that the NSF's ERCs are interdisciplinary, multi-institutional centers that join academia, industry, and government to produce transformational engineered systems.
- ERC Logic Models**: A section titled "Welcome to the Portal for International Research Center Search" from the U.S. National Science Foundation (NSF) Engineering Research Centers (ERCs).
- ERCs and International Collaboration Rationale**: A section titled "Executive Summary" discussing the benefits of international collaboration for engineering education and research.
- International Collaborations and Engineering Research Centers (ERCs): The Center-to-Center Mechanism**: A detailed section explaining the NSF's strategy to support international collaborations through the ERC program.

On the right side of the website, there is an "International Research Center Search" form with fields for "Text Search", "Language", "Region", and "Country". Below the form is a table listing various research centers and their countries.

Title	Country
Center for Research and Chemical Technology	Argentina
Chemical Engineering Pilot Plant	Argentina
Electrical Engineering Research Institute	Argentina
Institute for Research and Development in Process Engineering and Applied Chemistry	Argentina
Institute of Advanced Studies in Engineering and Technology	Argentina
Institute of Biological and Technological Research	Argentina
Institute of Biosciences of Patagonia	Argentina
Institute of Computer Science and Engineering	Argentina
Institute of Health Sciences Research	Argentina
Institute of Physicochemical Research of Córdoba	Argentina
Institute of Sciences of the Earth, Biodiversity and Environmental Sustainability	Argentina
Patagonian Institute for the Study of Continental Ecosystems	Argentina
Research and Development Unit in Pharmaceutical Technology	Argentina
Research Centre in Biological Chemistry of Córdoba	Argentina
Southern Geological Institute	Argentina
Southern Physics Institute	Argentina

25

Notice:
 Please contact webmaster@erc-assoc.org if you represent this Research Institution and have identified any required additions or modifications to the above information.



26

Thank you

