2003 PRRCA CITI PROGRAM SOLICITATION

PRRCA Communications and Information Technology Initiatives
Program Solicitation 2003-01

Preliminary Proposals Due Date: Friday, September 19, 2003 (5:00 p.m.)
Invited Full Proposals Deadline: Friday, October 24, 2003 (5:00 p.m.)
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1 Program Description
The Puerto Rico Research and Commercialization Alliance’s (PRRCA’s) Communications and Information Technology Initiatives (CITI) program is designed to strengthen the role of PRRCA academic member institutions in the creation, management, transfer, and commercialization of knowledge in the communications and information technology (C&IT) fields. Specifically, the CITI program enables a wide variety of research and education projects that, when taken together, form the foundation upon which Puerto Rico’s electronics manufacturing, e-business/e-government, financial/insurance information technology, and healthcare information technology business sectors, among others, will become globally competitive.

The research and education projects (“initiatives”) supported by the CITI program must significantly impact the intellectual and physical infrastructures available at the various PRRCA academic member institutions and enhance the commercialization potential of their research activities in the following focus areas:

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1 Focus area descriptions were obtained from various sources associated with the National Science Foundation (NSF), the Institute of Electrical and Electronics Engineers (IEEE), and the National Academies of Engineering (NAE).
• **A1 – Mobile wireless technologies**: This area encompasses, but is not limited to, wireless systems management, monitoring, and performance evaluation; quality of service; resource management and traffic control; protocols; multicast; and software frameworks for object-oriented networks, agent-based networks, multimedia, and other applications. This area also encompasses issues such as audit-detect network intrusions, firewalls, methodologies at the physical and data link Open Systems Interconnection (OSI) layers and above (Layers 2-7), including compression techniques, and coding for reliable transmission. Additional topics include: smart antennas, software radio and reconfigurable hardware-software mobile communication systems; platforms and frameworks for network management, service provisioning, resource allocation, and billing of heterogeneous future wireless networks.

• **A2 – Transaction/database technologies**: This area encompasses, but is not limited to, database system design, implementation, integrity, and management, including specification, implementation, verification, and maintenance of data and database systems. This area also encompasses the creation and support of interoperable, wide-area data systems that include a range of numerical, image, sound, video, and textual data. In terms of data storage, this area encompasses the design of new storage systems and storage system architectures for handling large data stores and allowing low-latency, fast-access, reliable retrieval and storage of data. In terms of information retrieval, sharing, and display, this area encompasses the retrieval and extraction of appropriate information to meet the requirements of the user. In particular, it includes novel approaches to knowledge discovery and data mining, such as recognition systems for multimedia data, intelligent query systems, agent technologies, search algorithms, data clustering, data wrappers, and browsing and navigation.

• **A3 – Network security technologies**: This area encompasses, but is not limited to, network management, monitoring, and performance evaluation; quality of service; resource management and traffic control; protocols; multicast; and software frameworks for object-oriented networks, agent-based networks, multimedia, and other applications. This area also encompasses issues such as audit-detect network intrusions, firewalls, methodologies at the physical and data link Open Systems Interconnection (OSI) layers and above (Layers 2-7), including compression techniques, and coding for reliable transmission. In terms of Information Security/Assurance, this area encompasses the fields of confidentiality, integrity, and denial-of-service. This area includes the protection of data, programs, and information stored on disks, networks (LAN, Wireless, and VPN), and hard drives. Included are novel applications for information security, access control models and mechanisms, World Wide Web, information warfare, intrusion detection and prevention, anonymity and privacy, firewalls, digital watermarking, steganography, secure local and distributed database systems, transaction processing, and auditing and security in object-oriented systems.

• **A4 – e-commerce/e-government technologies**: In terms of e-commerce, this area encompasses, but is not limited to, adaptive e-commerce system management; e-commerce oriented Grid Computing infrastructure; Web services computing technologies and middleware in e-commerce; dynamic business process integration, management, adaptation and composition; real-time Internet delivery technologies and scheduling protocols; security issues and data mining techniques; QoS support, workload and benchmark in e-commerce systems; transaction and work-flow management; collaborative business process modeling; universal commerce including mobile commerce and home commerce systems; auction and negotiation technology; visualization of business activity. In terms of e-government, this area encompasses, but is not limited to, e-Government development approaches; process models and e-Government frameworks; portals and citizen services; cross-organizational G2G cooperation and public-private partnerships; knowledge management in e-Government; mobile Government;
There are **five types of initiatives supported** by the CITI program: C&IT Centers of Excellence; Emerging Technologies; Human Resource Development; Infrastructure Development; and Feasibility Studies. A brief overview of each type is presented below:

- **I1 – C&IT Centers of Excellence:** C&IT Centers of Excellence enable innovative research, commercialization, and education projects that require a centralized organizational structure to achieve the knowledge creation, management, and transfer goals of the lead academic unit and its partners. Centers of Excellence are expected to stimulate industry and academic interaction that will enable world-class research and commercialization activities to be undertaken, while at the same time integrating these efforts into existing research and academic programs. The proponent lead institution shall be responsible for managing the Center, while its partners will be required to invest intellectual as well as financial resources to the Center. Partnerships may include interdepartmental collaboration among various academic units within a single institution, multi-institutional collaborations, and/or collaboration with industrial research laboratories. The Center must present a portfolio of research projects with high commercialization potential.

- **I2 – Emerging Technologies:** PRRCA is particularly interested in supporting projects in the previously defined C&IT focus areas that are determined to have a high potential for commercialization. To qualify for consideration under this solicitation, the applicant must be able to demonstrate that the proposed technology has already been subject of peer-reviewed research and development but that it is not yet commercially available. Proposals must include a business or commercialization plan for the emerging technology (in the Project Description section). The plan should explain how the proposed activities will contribute to the commercialization process and should establish the technology’s market
potential, barriers to entry, and possible showstoppers related to its broad use in Puerto Rico and elsewhere.

- **I3 – Human Resource Development**: PRRCA will consider funding projects whose main objectives are to significantly increase the number and enhance the quality of graduates with expertise in the C&IT focus areas of interest. Projects to be considered include, but are not limited to, curricular revisions (must include entrepreneurship components), development of certificate programs, development of new undergraduate and graduate academic programs, and continuing education programs.

- **I4 – Infrastructure Resource Development**: PRRCA will consider funding infrastructure development projects that will significantly impact an institution’s ability to compete for highly competitive Federal research programs (for example, National Science Foundation Engineering Research Centers) and/or lead to innovations with commercialization potential in PRRCA areas of interest. Consideration will also be given to infrastructure projects that will enable productive partnerships between the proposing academic unit and other institutions or organizations (academic and industrial).

- **I5 – Feasibility Studies**: PRRCA will consider funding experimental or theoretical projects whose objective are to demonstrate the feasibility and commercial potential of an innovative technology or process that supports one or more of the PRRCA focus areas. These studies could serve as the basis for a future PRRCA funded project under the “Emerging Technologies” initiative and/or grants from Federal research and development programs.

The 2003 PRRCA CITI program solicitation will follow the timeline described below:

1. Preliminary Proposals Due – Friday, September 19, 2003
2. Announce Invited List and Inform Declines – Friday, October 10, 2003
3. Invited Full Proposals Due – Friday, October 24, 2003
5. Final Board Review – Friday, November 14, 2003
6. Recommendations to PRIDCO Funding Decision Makers – Monday, November 17, 2003
7. PRIDCO Approves Recommendations – Wednesday, December 17, 2003
8. Declines Informed – Friday, December 19, 2003
10. Anticipated Date of Awards – March 2004.

### 2 Eligibility Information

Academic units associated with each one of the PRRCA academic member institutions are eligible to submit proposals for funding consideration under this 2003 PRRCA CITI program solicitation. The PRRCA academic member institutions are listed below, along with contact information for the institution’s PRRCA representative:

- **University of Puerto Rico**: Dr. Emma Fernández-Repollet, Vice-President for Research & Technology. Email: efernandez@rcm.upr.edu, Tel. 787-763-9401 / 787-765-8767, Fax 787-758-5206.
• **University of Puerto Rico-Mayagüez:** Dr. Lionel R. Orama-Exclusa, Special Assistant to the Chancellor. Email: lorama@ece.uprm.edu, Tel. 787-832-4040 x2121, Fax 787-834-3131.

• **Interamerican University:** Dr. Marcos Menéndez, Dean – Management and Technology Division (Bayamón Campus). Email: mmenendez@bc.inter.edu, Tel. 787-279-1912 ext. 2013, Fax 787-279-2205.

• **Sistema Universitario Ana G. Méndez:** Dr. Luis García-Feliú, Associate Vice-President for Academia Affairs, Office of Technology Transfer and Innovation. Email: lgarcia@suagm.edu, Tel. 787-751-0178, Fax 787-759-6411.

• **Polytechnic University:** Dr. Carlos González, Dean – Engineering, Sciences, and Land Surveying School. Email: gonzalez@pupr.edu, Tel. 787-754-8000 ext. 226 and 229, Fax

Each PRRCA academic member institution will submit a **maximum of 5 preliminary proposals** to the 2003 PRRCA CITI program. The PRRCA representatives for each academic member institution will be responsible for conducting the internal competition process from which preliminary proposals will be selected for submission to the PRRCA. Principal Investigators must be associated with the academic member institutions, but collaborations with external agents (industry, academia, government) are encouraged.

For eligibility purposes, all proposals must present a **cost sharing** commitment at a **minimum level of 30%** of the requested total amount of PRRCA funds. **Overhead costs** must be limited to **no more than 20%** of the applicable costs.

### Award Information

Approximately $4 million is expected to be available for this competition in FY 2003. PRRCA expects to make approximately six to eight multi-year awards in an effort to establish a strong portfolio of projects that will significantly impact the intellectual and physical infrastructures available at the various PRRCA academic member institutions in the C&IT areas of interest. The amount of the PRRCA's investment in each project will depend upon the scope, budget justification, and projected impact of the activities described by the proponents, as well as the availability of PRRCA funds. However, for proposal preparation purposes, the following guidelines are presented as what is expected to be typical funding levels and project durations:

<table>
<thead>
<tr>
<th>Type of Initiative</th>
<th>Project Duration</th>
<th>Total Funding Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centers of Excellence</td>
<td>3 – 5 years</td>
<td>$500K - $1.5M</td>
</tr>
<tr>
<td>Emerging Technologies</td>
<td>1 – 2 years</td>
<td>$50K - $150K</td>
</tr>
<tr>
<td>Human Resource Development</td>
<td>1 – 5 years</td>
<td>$100K - $1M</td>
</tr>
<tr>
<td>Infrastructure Development</td>
<td>1 – 2 years</td>
<td>$100K - $500K</td>
</tr>
<tr>
<td>Feasibility Studies</td>
<td>1 year</td>
<td>$50K - $100K</td>
</tr>
</tbody>
</table>

Awards from this competition are expected to be announced during the month of December 2003, while funding is expected to be disbursed on or before the month of March 2004. Oversight of each individual project will be the responsibility of the appropriate PRRCA academic member institution in coordination with PRIDCO/PRRCA. Quarterly project reviews will be conducted by PRIDCO/PRRCA. In the case of multiyear awards, support for each year of the funded project will be contingent upon a satisfactory annual review by PRIDCO/PRRCA.
4 Proposal Preparation and Submission Instructions

Each PRRCA academic member institution representative will be responsible for submitting to the CITI program officer the electronic versions (in PDF format) of those proposals chosen by their respective institutions. The preliminary proposal will consist of a main document and various supporting documents. The main document corresponds to items 1-7 described below, while the supporting documents correspond to items 8-10. The main document should not exceed 15 single-sided pages (single space, times roman 12 pt font, and one inch margins on all sides).

1. **Cover sheet:** The cover sheet should include the project’s title, identify the type of initiative and focus areas that are impacted, identify the academic member institution, provide contact information (telephone, fax, and e-mail), highest degree information (degree, university, and year), and position within academic institution for the Principal Investigator (PI) and the Co-Principal Investigators (CO-PI’s). Note that the scope of the proposal should span only one type of initiative (I1 – I5), but the initiative can impact various research focus areas (A1 – A6).

2. **Project Summary:** The summary should not exceed two pages. It should be written in the third person and must provide a clear accounting of how the project will positively impact the PRRCA goals for the type of initiative proposed and the research and development focus areas of interest. The project summary should be understandable to readers with technical and business backgrounds who nevertheless may not necessarily be experts in the specific research and development areas associated with the proposal. The project’s goals and objectives must be clearly articulated, as well as the specific tasks that will be undertaken to achieve them and the timeframe in which this will occur.

3. **Table of Contents**

4. **Project Description:** The project description must clearly articulate the short- and long-term goals and objectives of the proposed activities. This section must indicate how the proposed activities will support PRRCA’s mission in general, as well as the specific goals of the targeted type of initiative. Enough information must be provided to allow a proper assessment of the technical, educational, and managerial merit of the proposed activities and of their commercialization focus. A project plan is required (e.g., Gantt chart) clearly identifying quarterly milestones and the activities required to achieve them.

5. **Facilities and Equipment:** This section must describe the facilities and equipment available to support the proposed project activities.

6. **Budget and Budget Justification:** A detailed budget must be provided for each year of requested funding. A cumulative budget must also be provided. Cost sharing (cash and in-kind) at a minimum level of 30% is required. Overhead costs must be limited to no more than 20% of the applicable costs. Proponents should keep in mind PRIDCO’s Science and Technology Incentives Program guidelines when developing their budgets.

7. **References Cited:** Include a complete bibliography of all references cited. This section is not to exceed two pages.

8. **Biographical Sketches:** A two-page biographical sketch for all personnel with a management, research or education role must be provided. The sketch must include a list of relevant publications and other past or current grant or contract awards.
9. **Projected Funding by Source:** Include a list of other funding sources that will contribute to the proposed project, if applicable. Proponents should address how the proposed budget will leverage existing funds from other sources (NSF, DoD, NASA, etc.) in those cases where they are available.

10. **Results of Prior Support for PI and CO-PI’s:** Provide information regarding the major results obtained through other recent grants that have been obtained by the project’s PIs and Co-PIs, regardless of funding source.

Full proposals will be accepted only if invited by the PRRCA. The PRRCA will ask invited proponents to expand upon certain aspects of their preliminary proposals and to prepare a 30-minute presentation to be given to the PRRCA Board.

## 5 Proposal Review Information

The PRRCA Board will meet to screen and evaluate all the preliminary proposals that are received. The PRRCA Board will review only those applications that, in its sole judgment, meet the overall goals and objectives of the PRRCA CITI program. Furthermore, the PRRCA Board will evaluate proposals on their technical merits, the qualifications of the proponents, commercialization potential, the level of matching commitments, leveraging of existing funds, and the financial merits of the proposal. The evaluation process will also consider the proposal’s ability to support a synergistic model of collaboration among academia, government, and industry.

Once the screening process is completed, the PRRCA Board will invite full proposals from the selected proponents. In their invitation, the PRRCA will provide specific guidelines regarding the areas of the preliminary proposals that should be expanded on in the full proposal. Invited proponents must also arrange to participate in a proposal review session where they will have 30 minutes to present their proposal to the PRRCA Board.

Once all invited proposals are reviewed, the PRRCA and the successful proponents will enter into negotiations regarding the scope, timeframe and partnership arrangements of the proposed project. Once negotiations are completed, the PRRCA Board will make its recommendations to the PRIDCO Board for final funding approval. Once approval is obtained, PRIDCO/PRRCA and the successful proponents will enter into a Project Grant Agreement, which will outline any and all special requirements associated with the grant award.

## 6 Award Administration Information

A PRRCA award will consist of: (1) the award letter indicating the terms and conditions of the award and any changes in scope, timeframe, or partnership arrangements that may apply; (2) the budget indicating the amounts to be funded by PRRCA and the specific expense categories, (3) a complete copy of the final, revised proposal that is awarded, and (4) the signed Project Grant Agreement.

Grant awardees will be required to submit quarterly and annual progress reports that will also present future plans and activities. Within 90 days of expiration of an award, a final report must be submitted. Grant disbursements will be made according to the applicable PRIDCO Science and Technology Incentives Program guidelines.
7 About the PRRCA

The PRRCA is an alliance between higher educational institutions, government, and industry that contributes directly to Puerto Rico’s long-term economic development primarily through the collaboration of resources and related infrastructures in fields of interest complementary to the island’s global business opportunities – attracting top global research talent and funding to the island and fostering the commercialization of university technology. The PRRCA’s vision and mission statements are presented below:

- **Vision.** To become a principal motor of economic growth for Puerto Rico through innovation and global commercialization of science & technology research.

- **Mission.** To promote the economic development of Puerto Rico by forging alliances and collaborative activities between government, industry, and academia that will:
  
  - Significantly increase research & development (R&D) funding activity in Puerto Rico by building on the specific, marketable competencies of local universities.
  
  - Raise the level of investment in local R&D infrastructure and support programs & services for global commercialization.
  
  - Support researchers, entrepreneurs, and private firms in Puerto Rico to become highly competitive for federal, Commonwealth, and private funding.
  
  - To gear the funds and resources of the academia, government, and private industry towards programs and initiatives focused in identified areas.