Introduction
The New York State Pollution Prevention Institute (NYSP2I) is a partnership among NYS Department of Environmental Conservation (DEC), Rochester Institute of Technology (RIT), Rensselaer Polytechnic Institute (RPI), University of Buffalo, and Clarkson University with a statewide research. The goal of NYSP2I is to make the State more sustainable for workers, the public, the environment and the economy through pollution prevention. Pollution prevention is reducing or eliminating waste at the source by modifying production processes, promoting the use of non-toxic or less-toxic substances, implementing conservation techniques, and re-using materials rather than putting them into the waste stream.

Program Summary
NYSP2I’s R&D Program focuses on applied research - research that will lead to short term solutions to keep New York State companies competitive in the marketplace while reducing their environmental footprint (see more detailed explanation of applied research below). The focus is to solve specific problems where the solution results in broad impacts, transferable practices and technologies applicable to NY businesses and manufacturers in New York State.

Current research and development priorities include the use, elimination or substitution of toxic chemicals, overall waste reduction, and energy and water efficiency opportunities. Proposals that focus on sustainable & innovative technologies or processes that reduce material, water or energy intensity are encouraged. Examples of past funded projects can be found here: http://www.rit.edu/affiliate/nysp2i/research-and-development

Purpose
The purpose of this Request for Proposal (RFP) is to solicit projects to be undertaken by NYSP2I Partner University faculty, students, and staff that will focus on the R&D priorities stated above. The project must meet the following criteria to be considered:

- Have a pollution prevention and/or green engineering focus.
- Have the potential to have a positive environmental impact in New York State.

Preference will be given to projects that:

- Identify the NY industry sector(s) that can potentially benefit from the proposed work.
- Focus on source reduction methodologies.
- Show collaboration with one or more NYS manufacturer(s).
- Are applied research projects that fall within the Technology Readiness Levels (TRL) 4 through 7. The TRL scale was developed initially by NASA to categorize the different stages of research and development and has been broadly applied to different agencies and programs. The table summary provided below is from the Department of Energy and can be used as a guide. Basic research or proof of concept projects will not be funded (TRL 1-3). Conversely, developmental projects that are close to commercialization (TRL 8-9) are not the focus of this grants program; NYSP2I also offers a program called the Green Technology Accelerator Center (GTAC) which is...
designed to assist NY companies test and evaluate new technologies or processes that are ready to be commercialized (http://www.rit.edu/affiliate/nysp2i/green-technology-accelerator-center-gtac).

<table>
<thead>
<tr>
<th>Relative Level of Technology Development</th>
<th>Technology Readiness Level</th>
<th>TRL Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Operations</td>
<td>TRL 9</td>
<td>Actual system operated over the full range of expected conditions.</td>
<td>Actual operation of the technology in its final form, under the full range of operating conditions. Examples include using the actual system with the full range of wastes.</td>
</tr>
<tr>
<td>System Commissioning</td>
<td>TRL 8</td>
<td>Actual system completed and qualified through test and demonstration.</td>
<td>Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental testing and evaluation of the system with real waste in hot commissioning.</td>
</tr>
<tr>
<td>Technology Demonstration</td>
<td>TRL 7</td>
<td>Full-scale, similar (prototypical) system demonstrated in a relevant environment.</td>
<td>Prototype full scale system. Represents a major step up from TRL 6, requiring demonstration of an actual system prototype in a relevant environment. Examples include testing the prototype in the field with a range of simulants and/or real waste and cold commissioning.</td>
</tr>
<tr>
<td>Technology Development</td>
<td>TRL 6</td>
<td>Engineering/pilot-scale, similar (prototypical) system validation in a relevant environment.</td>
<td>Representative engineering scale model or prototype system, which is well beyond the lab scale tested for TRL 5, is tested in a relevant environment. Represents a major step up in a technology’s demonstrated readiness. Examples include testing a prototype with real waste and a range of simulants.</td>
</tr>
<tr>
<td></td>
<td>TRL 5</td>
<td>Laboratory scale, similar system validation in relevant environment</td>
<td>The basic technological components are integrated so that the system configuration is similar to (matches) the final application in almost all respects. Examples include testing a high-fidelity system in a simulated environment and/or with a range of real waste and simulants.</td>
</tr>
<tr>
<td></td>
<td>TRL 4</td>
<td>Component and/or system validation in laboratory environment</td>
<td>Basic technological components are integrated to establish that the pieces will work together. This is relatively “low fidelity” compared with the eventual system. Examples include integration of “ad hoc” hardware in a laboratory and testing with a range of simulants.</td>
</tr>
<tr>
<td>Research to Prove Feasibility</td>
<td>TRL 3</td>
<td>Analytical and experimental critical function and/or characteristic proof of concept</td>
<td>Active research and development is initiated. This includes analytical studies and laboratory scale studies to physically validate the analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative. Components may be tested with simulants.</td>
</tr>
<tr>
<td>Basic Technology Research</td>
<td>TRL 2</td>
<td>Technology concept and/or application formulated</td>
<td>Invention begins. Once basic principles are observed, practical applications can be invented. Applications are speculative, and there may be no proof or detailed analysis to support the assumptions. Examples are still limited to analytic studies.</td>
</tr>
<tr>
<td></td>
<td>TRL 1</td>
<td>Basic principles observed and reported</td>
<td>Lowest level of technology readiness. Scientific research begins to be translated into applied research and development (R&amp;D). Examples might include paper studies of a technology’s basic properties.</td>
</tr>
</tbody>
</table>

Eligible Applicants
Current faculty and staff at Rochester Institute of Technology, Rensselaer Polytechnic Institute, Clarkson University, and the University at Buffalo.
Funding Period
Proposals should describe a project of up to 12 months in duration, starting after July 1, 2015. Multi-year awards (up to 3 years) will also be considered with a start date after July 1, 2015.

Award Information
Individual, one year awards are expected to range from $50,000 to $75,000. Multi-year projects (up to 3 years) should include a budget that does not exceed $50,000 per year. The amount of the award will be commensurate with the quality of proposals received and anticipated results and impact to NYS. Awards are subject to the availability of funding. NYSP2I is not obligated to make any awards under this RFP.

Proposal Deadline
Monday, December 1, 2014 by 5:00 pm EST. Please submit proposals (single PDF file) by email to:

R&D Program
New York State Pollution Prevention Institute
Rochester Institute of Technology
111 Lomb Memorial Drive
Rochester, NY 14623
Email: expasp@rit.edu

Anticipated Award Notification Date
April 10, 2015

Other Important Information
Reporting - Quarterly progress reports will be required and are due on the 5th of the month following each calendar quarter. A final report will be due within 30 days of project completion.

NYSP2I may be able to assist PI’s in making connections with industry if needed.

NYS Standard Terms and Conditions, NYS Department of Environmental Conservation Terms and Conditions and relevant prime contract Terms and Conditions will be applicable to projects funded under this R&D program.*

Intellectual Property - The following terms will be applicable to projects awarded under this R&D program:

Intellectual property developed with funding from NYSP2I is meant to advance the state of the art in pollution prevention for the benefit of the citizens of New York State. Those who create, will own any intellectual property they develop through NYSP2I funding. Any intellectual property developed with NYSP2I funding will be available to the New York State Department of Environmental Conservation through a perpetual, non-exclusive, royalty free, transferable license. In addition, the NYSP2I shall have a non-exclusive, royalty free license to use intellectual property for non-commercial research and educational purposes. Furthermore, the owner of intellectual property will not charge any company based in New York State for the right to use such intellectual property.*

*Terms may be subject to change.
Proposal Requirements (10 page limit for sections 1, 2, and 3)

1. Cover Page
   a. Title of proposal
   b. Name of principal investigator
   c. Name of co-principal investigator (if applicable)
   d. Name of university / institution affiliations - College and Department
   e. Physical address and phone
   f. Principal investigator(s) email address(es)

2. Abstract
   The abstract should be a one-page summary of the project. It should include a statement of objectives, methodology, and expected outcomes, and discuss the relevance to NYSP2I’s R&D priorities, and the significance of the project in terms of the potential impact to New York State and the environment.

3. Project Narrative
   The Project Narrative should include:
   • A description of the problem with clear objectives and its importance to a particular NYS sector.
   • The current state of research in this field.
   • The basic research hypothesis to solve this problem.
   • Statement of Technology Readiness Level of proposed technology or process.
   • The research plan and technical approach including expected results if successful and defined metrics that will be used to measure the potential positive environmental impact in New York State; the work plan should clearly state the key tasks needed to successfully complete the proposed project.
   • A description of the potential broader environmental and/or geographic impacts of the proposed project on a state-wide, national or global scale.
   • Required resources including project personnel, items required for project success provided by the university (e.g. laboratories, computers, software, equipment, background IP), and any non-NYSP2I funding.
   • Schedule - Note: all one year research projects must be completed by September 30, 2014. Also include a Gantt chart that describes the tasks, timeline, and allocation of resources and funding (see last page for example).

4. Budget
   Include direct expenses (personnel costs and non-personnel costs) and indirect costs including any overhead – Note: F&A (overhead) not to exceed 30.5%; also include a budget justification.

5. CVs – Provide CV for Principle Investigator and Co-PIs

Proposal Length and Format: Proposals must be no more than 10 single spaced, numbered pages including the cover page and 1 page abstract (i.e., a page equals one side). Budget and CVs should be attached as an Appendix and are not included in the page limit. All reference should be cited and can be included as endnotes, which will not be included in the page limit.

Review Criteria: Proposals will be scored based on a list of criteria provided on the following page. It is important to keep in mind that projects need to focus on the higher priorities of pollution prevention.
An example of a source reduction project would be the development of a new metal plating process that uses lower amounts of acids and heavy metals, a process change which results in fewer toxic chemicals used and less waste being created.

<table>
<thead>
<tr>
<th>Evaluation Categories</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fit with Priorities Listed</td>
<td>20</td>
</tr>
<tr>
<td>Potential Broad Impacts</td>
<td>20</td>
</tr>
<tr>
<td>Application/Tech Transfer Potential</td>
<td>15</td>
</tr>
<tr>
<td>Innovativeness</td>
<td>10</td>
</tr>
<tr>
<td>Approach/Methods</td>
<td>10</td>
</tr>
<tr>
<td>Project Plan/Follow Required Proposal Format</td>
<td>5</td>
</tr>
<tr>
<td>Qualification of PIs</td>
<td>10</td>
</tr>
<tr>
<td>Collaboration with Manufacturing Company</td>
<td>10</td>
</tr>
</tbody>
</table>

Submission: Proposals must be submitted by 5:00 PM EST, Monday, December 1, 2014, as a single PDF file, via email to:

R&D Program
New York State Pollution Prevention Institute
Rochester Institute of Technology
111 Lomb Memorial Drive
Rochester, NY 14623
Phone: (585) 475-2603
Email: expasp@rit.edu
For questions regarding the NYSP2I R&D program or this solicitation contact:

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Rochester, NY 14623
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The New York State Pollution Prevention Institute (NYSP2I) is a state-wide research and technology transfer center whose mission is to make New York State more sustainable for workers, the public, the environment, and the economy.

NYSP2I is headquartered at Rochester Institute of Technology (RIT) and is a partnership between RIT, Clarkson University, Rensselaer Polytechnic Institute, University at Buffalo and the 10 NYS Regional Technology Development Centers.

To learn more about NYSP2I visit: http://www.rit.edu/affiliate/nysp2i/

Information regarding NYSP2I’s R&D Program can be found at: http://www.rit.edu/affiliate/nysp2i/research-and-development.

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Funding provided by NYS Department of Environmental Conservation
## Example Schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>1st Quarter</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
<th>4th Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 1: Sample gathering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 2: Literature Search</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 3: Model Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 4: Equipment Set-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phase 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 1: Experiments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 2: Analysis of Results</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 3: Final Report</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Resources

<table>
<thead>
<tr>
<th>Resources</th>
<th>1st Quarter</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
<th>4th Quarter</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Investigator (hours)</td>
<td>5</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td>Students (hours)</td>
<td>30</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>Contractors/Consultants</td>
<td>20</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>60</td>
</tr>
</tbody>
</table>

### Estimated Expenditures

<table>
<thead>
<tr>
<th>Expenditures</th>
<th>1st Quarter</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
<th>4th Quarter</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Investigator</td>
<td>$250</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$7,750</td>
</tr>
<tr>
<td>Students</td>
<td>450</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>900</td>
</tr>
<tr>
<td>Other Contractors/Consultants</td>
<td>3,000</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>7,500</td>
</tr>
<tr>
<td>Test Costs (pilot studies, analytical testing)</td>
<td>1,000</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>2,500</td>
</tr>
<tr>
<td>Disposal Costs</td>
<td>3,800</td>
<td>3,800</td>
<td>3,800</td>
<td>3,800</td>
<td>15,200</td>
</tr>
<tr>
<td>Permanent Equipment (system costs)</td>
<td>1,200</td>
<td>1,000</td>
<td>4,000</td>
<td>4,000</td>
<td>10,200</td>
</tr>
<tr>
<td>Other (supplies)</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>2,000</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>$10,200</strong></td>
<td><strong>$9,950</strong></td>
<td><strong>$12,950</strong></td>
<td><strong>$12,950</strong></td>
<td><strong>$46,050</strong></td>
</tr>
</tbody>
</table>

### Deliverables

(State expected outcomes at for each quarter)