REQUEST FOR PROPOSALS (RFP)

SOLID AND HAZARDOUS WASTE RESEARCH
STATE UNIVERSITY SYSTEM OF FLORIDA

HINKLEY CENTER FOR SOLID AND HAZARDOUS WASTE MANAGEMENT

The William W. “Bill” Hinkley Center for Solid and Hazardous Waste Management is responsible for coordinating the State of Florida’s solid and hazardous waste research program. The Center sponsors research projects at public and private universities in Florida that address critical solid and hazardous waste management issues. The Florida Legislature created the Hinkley Center in 1988 as a statewide research center. The host institution for the Hinkley Center is the University of Florida, College of Engineering.

The core mission of the Hinkley Center is to sponsor, conduct and coordinate pragmatic, applied, and timely research on important issues and problems on solid and hazardous waste management, and to provide assistance and information to the Florida Department of Environmental Protection (FDEP), local governments and the private sector.

Important components of the Hinkley Center’s mission are:

- To establish research priorities that are important to the FDEP, local governments and the private sector;
- To conduct and coordinate a fair, open, and transparent research selection process using input from members of the waste management community, and state and local government where faculty from public and private universities in Florida can compete on an equal basis for research funding;
- To coordinate, sponsor, and conduct practical and meaningful solid and hazardous waste management research that has a timely and beneficial impact to the waste management community including the FDEP and county solid waste regulatory staff, county solid waste directors and their staff, landfill operators, consulting engineers and scientists, waste haulers, private waste management companies, and the USEPA;
- To provide information that supports sound solid and hazardous waste management decision-making processes;
- To distribute research results to a wide variety of stakeholders;
- To provide a forum for the exchange of information and ideas;
- To respond to requests for information and technical assistance;
- To develop, through research and demonstration projects, innovative, low-cost, and environmentally sound methods and strategies for the management of solid and hazardous wastes;

ISSUED: November 3, 2014
DUE DATE: December 12, 2014 by 5 p.m.
To facilitate technology transfer and information dissemination efforts regarding information generated by the research faculty at the academic institutions to members of the solid waste community;

To train solid and hazardous waste management personnel;

To identify and pursue sources of support for research and other programs;

To provide research opportunities on “real-world problems” for graduate students pursuing advanced degrees related to waste management.

The Center sponsors research at public and private universities and colleges in Florida accredited by the Southern Association of Colleges and Schools. The Center has provided funding for more than two hundred research projects at Florida’s private and public universities since 1988. Faculty members from 10 universities in Florida have received funding for research projects. These include the University of West Florida (UWF), Florida State University (FSU), Florida Agricultural and Mechanical University (FAMU), the University of Florida (UF), the University of Central Florida (UCF), the University of South Florida (USF), the Florida Institute of Technology (FIT), Florida Atlantic University (FAU), Florida International University (FIU), and the University of Miami (UM). It is Hinkley Center’s objective to encourage faculty from accredited public and private universities and colleges in Florida to participate in the Center’s research program and respond to the Request for Proposals and seek funding from the Hinkley Center. Large numbers of graduate students have received their masters or doctorates degree while conducting research that was sponsored by the Hinkley Center. Many of these graduate students have found faculty positions at distinguished universities in both the United States and abroad, as well as employment in local, state and federal regulatory agencies, and the private sector including consulting firms, industry and manufacturing.

This announcement solicits brief research pre-proposals (a maximum of five pages) from faculty currently employed in State of Florida private and public colleges and universities who wish to apply their expertise to innovate and develop solutions for Florida's solid and hazardous waste management issues. The Center anticipates having approximately $470,000 available for sponsored research as an appropriation from the 2015 Legislature Session for FY 2015-2016. The availability of this funding is contingent upon an appropriation by the Florida Legislature. These funds will be available for initiating new research projects and possible continuation of existing research projects.

Review Process

In response to this RFP, interested researchers are invited to submit a pre-proposal to the Hinkley Center. Researchers may contact the Hinkley Center Staff to discuss their ideas for pre-proposals. The Hinkley Center Staff may be able to provide the researcher with additional background information and expert contacts in the regulatory community and waste management industry regarding the research topic being considering. The Hinkley Center Staff may also be able to provide the researcher with ideas for seeking additional sources of funding for their proposal. If you have any questions or would like to discuss your proposal with the Hinkley Center Staff, you can call the Center at 352-392-6264 or email center@hinkleycenter.org.
After an evaluation of submitted pre-proposals by the Hinkley Center’s Research Selection Committee (RSC), selected researchers will be invited to submit full proposals for funding consideration. The RSC will review all of the full proposals and select some researchers to make a presentation to the RSC. Finally, after hearing presentations from the invited researchers, the RSC will develop recommendations for funding. After being reviewed by the Center’s Advisory Board, the Executive Director of the Hinkley Center will make a final decision regarding funding. Researchers who do not submit a pre-proposal adhering to the guidelines included in this RFP will not be eligible to participate in the full proposal selection process.

Researchers who submit pre-proposals or subsequent full proposals are responsible for making sure that their submissions are received by the Hinkley Center. If you submit a pre-proposal or full proposal and you do not receive an email acknowledging receipt of your submission within 24 hours, it is your responsibility to follow up with the Hinkley Center staff to advise them that a pre-proposal or full proposal was submitted by the deadline date.

Schedule

The important dates for the Center's current selection cycle for funding of projects in Fiscal Year 2015-2016 are as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>Dec. 12, 2014</td>
<td>Deadline for receipt of pre-proposals, 5:00 PM.</td>
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<tr>
<td>January 26, 2015</td>
<td>Notification of selected researchers who are invited to submit a full proposal</td>
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<tr>
<td>April 6, 2015</td>
<td>Deadline for receipt of full proposals 5:00 PM,</td>
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<tr>
<td>May 27-28, 2015</td>
<td>Proposal presentation to the RSC in Orlando.</td>
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<tr>
<td>June 22, 2015</td>
<td>Notification of awards.</td>
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Awards for projects selected for funding will be made after the Center receives its appropriation from the 2015 Legislative Session for FY 2015-2016. The start date of the research projects will be tailored to meet the researcher’s academic schedule and state funding guidelines, typically August or September 2015.

Eligibility

Faculty at private and public universities and colleges located in the State of Florida that are accredited by the Southern Association of Colleges and Schools may submit pre-proposals.

The current Research Agenda (starting on Page 9) provides a list of research ideas for faculty to consider in submitting pre-proposals to the Hinkley Center. The list is organized under broad topic headings with information below each topic. Researchers are encouraged to view the Center’s web site, (www.hinkleycenter.org) to see research ideas on Research Agendas from previous years, and to also see the research projects that have been previously funded by the Hinkley Center.

The Center also considers research proposals on topics that are not on this list. Please note that the Hinkley Center will not fund a proposed research project simply because the pre-proposal focuses
on a research topic that was included on the Research Agenda.

The Hinkley Center evaluates the proposals received each year and then determines whether, and the extent to which, funds will be provided for proposed projects. The decision to approve or reject a proposal depends on a variety of factors, including but not limited to: (a) the practical relevance, timeliness, and scientific merits of the proposed research; (b) the amount of funds available for funding new and continuing projects; (c) the number and cost of the research projects that have been proposed; (d) the research projects that already are under way or have been completed; and (e) whether the research project will help the Hinkley Center advance its overall mission. The Hinkley Center has the exclusive authority to evaluate and weigh each of these factors, based on its sole discretion, in light of the facts known at the time when the proposals are evaluated.

Consequently, the Hinkley Center may provide funds for research topics that are not included in this Research Agenda and may reject proposals that are based on one or more of the Agenda topics.

The Hinkley Center awards funds appropriated by the Legislature for research projects. The projects are to be conducted by faculty members of the state’s public and private universities through the use of University resources including students and laboratories. The state funds distributed by the Hinkley Center typically will not be awarded for projects primarily conducted by out-of-state faculty, consultants or other private entities. Pursuant to the policies adopted by the Hinkley Center, “private sector subcontracting of any portion of a contract supported by state funds should be kept to a minimum, be justified, and be approved by the Executive Director of the Center.” An example of a possible exception includes payment for the use of specialized equipment or testing which is not available at the funded university, but is accessible through a consultant or subcontractor. Even for such cases, the Executive Director of the Center should be contacted for approval prior to submission of a pre-proposal or a full proposal.

**Direct and Indirect Costs**

The Center can support only direct research costs. Direct research costs include, but are not limited to, salaries of research personnel, requisite fringe benefits, student support, supplies, travel, communications, and equipment essential to conduct the proposed scope of work. Center funds may not be used to pay indirect costs.

**Leveraging Other Funds**

Researchers are encouraged to leverage the Center's funds by obtaining supplemental funding from external sources and real-dollar contributions from public and private sources. Researchers should specify potential sources of funds and identify how they will seek external funding. Researchers should indicate, if applicable, how they have used previous funding from the Hinkley Center to leverage other sources of funding for their research.
Contents of Pre-Proposal and Full Proposal

The Hinkley Center requires that the pre-proposal be submitted electronically to center@hinkleycenter.org as an email attachment (written in Microsoft Word), by 5:00 p.m. December 12, 2014. The body of the pre-proposal should contain no more than five (5) numbered pages in a 12-point font and at a minimum contain the following:

- Abstract
- Project title
- Name(s) and contact information of the Principal Investigator(s)
- Methodology/scientific approach with a timeline
- Practical, specific benefits for end users
- Deliverables
- Budget outline
- Identification of Pertinent Literature
- A plan for seeking funding from other sources
- A description of project deliverables
- A one-page curriculum vita for each investigator on the proposed project (CVs are not included as part of the 5-page limit)

Invited Full Proposals

The Center requires that the invited full proposal, due at 5 p.m. on April 6, 2015, be no more than twenty (20) pages in length and, in addition to information listed above, it must include the following:

- Detailed budget, justification and scope of work approved by their institution
- List of individuals knowledgeable in the specific subject of the research who are willing to serve as advisors or peer reviewers to the researcher(s) to ensure project success (Technical Awareness Group - TAG). The TAG list should include contact information for these individuals.
- Timeline/milestones
- Investigators must include a plan in their proposal that describes how the information obtained from this project will be communicated to others, i.e. the waste management sector, regulators, landfill owners/operators.

Duration of Project

Projects are funded for a one-year period. Full proposals for projects that require multiple years to complete should include specified yearly completion goals with corresponding annual budgets. Funding for an additional year of a currently funded project is dependent on receipt of a year 2 pre-proposal, an invitation to submit a full proposal, relevancy of the project to the current Hinkley Center Research Agenda, recommendation by the RSC and the Advisory Board, and approval by the Center's Executive Director.
Deliverables

The Hinkley Center sponsors research that provides practical solutions and answers to current solid waste management problems. Information and data on waste management issues that can be applied in the immediate future are needed. Center-funded researchers are required to submit Metrics, Quarterly Progress Reports and a Draft and Final Technical Report. Researchers also are required to form a Technical Awareness Group (TAG) for their project and to hold a minimum of two TAG meetings. TAG meetings are held to encourage information exchange between the investigators and interested parties in the public and private sectors. Each proposed research project should identify a minimum of five persons external to the project university who are willing to serve on the project TAG. TAG members should be persons in the public or private sector who are interested in the proposed research project, are willing to attend TAG meetings, give advice and suggestions to the Principal Investigator regarding the proposed research project and are willing to lend their expertise to the research project by reviewing the Draft Final Report. These reports are included in the Center’s Report Guide, which is available on www.HinkleyCenter.org.

Other contractual requirements include:

- Development and submittal of the following:
  - Abstract (description of the project for the general public)
  - Quarterly Reports (work accomplished during the period, information dissemination activities, additional funding secured, etc.)
  - Progress in meeting the Metrics that the Hinkley Center has adopted (routine updates of the project including publications, presentations, collaborations, etc.)
    An example of this is provided on Page 8.
  - Draft Final and a Final Report – The Draft Final Report must be reviewed by the project’s TAG members, edited to address their comments, and submitted as a Final Report to the Center. The Final Report is posted on the Center’s web site and is also distributed to solid and hazardous waste stakeholders.
  - Other periodic updates as requested

- Development and maintenance of a project website.
  - The website is to include the project abstract, the Full Proposal (minus financial information regarding salaries, etc), the names of TAG members and meeting information, digital photos of investigators and students associated with the project, and acknowledgment of sponsorship and funding from the Hinkley Center.
  - The website is to be updated regularly by posting Quarterly Reports as the project progresses, TAG meeting minutes, videos of TAG meetings, and digital photographs of investigators and students engaged in activities related to the research project throughout the course of the project.

- Coordination of at least two Technical Awareness Group (TAG) Meetings
  - Remote participation in the TAG Meeting must be made available via videoconferencing on the Web using software such as Go To Meeting.
  - A video recording and typed meeting minutes of all TAG Meetings are required.
Investigators are responsible for the video recording of their TAG Meetings. These video links and meeting minutes are to be posted on the project website so interested persons can watch the TAG meeting at a later point in time.

- Travel availability as needed or requested by the Center Staff
  - This includes possible project meetings with the Center staff, FDEP or other solid waste stakeholders. This may also include presentation of the Hinkley Center sponsored research at relevant conferences or seminars.

**Evaluation Criteria**

The following criteria serve as guidelines to the Research Selection Committee for evaluating and ranking pre-proposals and full proposals.

- Practical relevance of research to the Hinkley Center’s research agenda
- Scientific merit of the research approach
- Expectation of end user benefit
- Experience and resources of the applicant
- Appropriateness of the proposed budget to the research objectives and the availability of external funds to help support the project
- Timeliness of the submission of deliverables from previous projects sponsored by the Hinkley Center (if applicable).

**Student Tracking**

The Hinkley Center maintains a web page recognizing current and past students supported by or involved in Center-funded research projects. In your proposal, please identify former students who have worked on previous Center-funded projects. Also, please identify where the students are currently employed with their contact information.

**Full Proposal Submission**

The electronic copy of the full proposal must be received by the Hinkley Center (center@hinkleycenter.org) by 5:00 PM. on April 6, 2014. Please send the full proposal as an email attachment.

An original, signed copy of the institutionally endorsed full proposal should be sent to:

*John D. Schert, Executive Director*

_Hinkley Center for Solid and Hazardous Waste Management_

_P. O. Box 11601, Gainesville, FL 32611_

*(Physical Address: 1929 Stadium Road, Nuclear Science Bld 634, Rm 528, Gainesville, FL 32611)*

The hard copy of the proposal must arrive by April 10. The electronic version must be received by 5 p.m. on April 6, 2015.
Researchers who submit proposals are responsible for making sure that their submissions are received by the Hinkley Center. If you submit a pre-proposal or full proposal and you do not receive an email acknowledging receipt of your pre-proposal or full proposal within 24 hours of the time that you emailed it to the Hinkley Center, it is your responsibility to follow up with the Hinkley Center staff to advise them of your submission by the deadline date.

The Center Staff will be pleased to answer any questions applicants have about the Research Agenda or the Center's research selection process. Phone: 352-392-6264
www.hinkleycenter.org

Metrics Guideline

1. List graduate student or postdoctoral researchers funded by this Hinkley Center project

Name
Rank (grad or postdoc)
Department
Professor
Institution

2. List undergraduate researchers working on this Hinkley Center project

Name
Department
Professor
Institution

3. List research publications resulting from this Hinkley Center project (use format for publications as outlined in this Report Guide)

4. List research presentations resulting from this Hinkley Center project (use format for presentations as outlined in this Report Guide)

5. How have the research results from this Hinkley Center project been leveraged to secure additional research funding?

6. What new collaborations were initiated based on this Hinkley Center project?

7. How have the results from this Hinkley Center funded project been used (not will be used) by FDEP or other stakeholders? (1 paragraph maximum)
2015 Research Agenda

Environmental

1. What are the impacts to soil, surface water and groundwater of the land application of compost made using municipal solid waste?

2. Historically, recycling and reuse have been considered the “green/sustainable” method of reducing the demand for landfill disposal. Recently gasification has been touted as an alternative method for producing energy and reducing the need for landfiling of residue. Recycling and reuse often require a lot of hauling handling and processing that consumes fossil fuels and energy. At what point do waste reduction processes become waste producing processes because of the energy requirements and pollutant production related to transportation, handling and processing? Compare the energy and carbon foot prints of various solid waste management techniques including, but not limited to, landfilling, waste-to-energy (WTE) by incineration, recycling specifically paper and plastics where WTE is available, gasification and composting.

3. Research the ubiquity of benzo(a)pyrene concentrations resulting from both natural and human activity in select land use, locational and soil type settings. This research would expand on available Florida based background studies and help establish a broader dataset of available natural and anthropogenic background concentrations for benzo(a)pyrene. If a meaningful background dataset can be established for select land use, locational and soil type settings, it is hoped that the information will help project managers better determine if benzo(a)pyrene concentrations detected at cleanup sites are related to a specific discharge or are within expected background levels.

It is expected that the research project would include a fair amount of soil sampling/analysis to provide independent data focused on select land use, locational settings and soil type settings. Benzo(a)pyrene was specifically identified in this research idea since it is the index chemical for carcinogenic PAHs, and normally noted as the most problematic carcinogenic PAH contaminant detected in soil. Nevertheless, the inclusion of the other carcinogenic PAH compounds in the analysis would help towards calculating benzo(a)pyrene toxic equivalency concentrations for the select research areas. It is hoped that the representative dataset could be used to help determine if carcinogenic PAH concentrations detected at cleanup sites need to be addressed by the cleanup action or if they are considered to be within expected natural or anthropogenic levels.

4. Solid waste management facilities use stormwater treatment systems to collect and treat stormwater run-off before the stormwater is discharged off-site. Are the stormwater management facilities at solid waste management facilities effective in treating the stormwater so that it meets surface water standards? This information would either support or refute the allegation that typical stormwater treatment systems are not adequate to treat the run-off from landfills, transfer stations, etc., that receive household garbage. It would be useful to determine whether facilities that receive WTE ash have elevated levels of
chlorides in the stormwater. If so, the question is what needs to be done to provide for better treatment of the stormwater?

Landfill Design and Management

5. What are the best engineering practices for the use of angular gravel, crushed granite and carbonate aggregate in landfill leachate collection systems? Florida’s engineers have routinely used rounded river rock in leachate collection systems, for fear of sharp-edged rock doing harm to geomembrane. Most Class I landfills in the state utilize a drainage net or composite drainage net to enhance leachate flow and reduce the liquid head over the liner. Some would expect that drainage net, when located between the granite and geomembrane, would protect a geomembrane from sharp-edged crushed granite, while others may consider such protection inadequate. Laboratory testing may help resolve this issue, as more and more designers are being pressed to use crushed granite, which is less expensive when compared to rounded river rock. It is possible that a beefier drainage net would need to be specified.

6. What is the appropriate use of carbonate rock in leachate collection systems? This issue is somewhat related to the above, but different enough to deserve its own look. Most Florida landfill designers prohibit the use of carbonate rock in leachate collection systems, using the more expensive rounded river rock (or crushed granite, in a few cases). The carbonate content of cover soils is also often limited. This is done out of fear of calcium-related clogging of the leachate collection system. It has been argued that leachate is already supersaturated with carbonate species, such that the use of carbonate rock would not add to the clogging issue. What are the best design practices in this area?

7. Leachates from municipal solid waste (MSW) and hazardous waste landfills contain a wide range of volatile organic compounds (VOCs) in addition to inorganic compounds. VOCs have been shown to migrate and contaminate the surrounding environment and impair the use of groundwater. How effective are modern landfill liner systems to prevent the migration of VOCs to groundwater? Many modern landfills employ a composite liner consisting of a geomembrane overlying a compacted clay liner or a geosynthetic clay liner. The geomembrane is often believed to be the primary barrier to contaminant transport. However, do VOCs migrate through geomembrane? If yes, the clay component is the controlling factor for the transport of VOCs. How effective are Florida landfill liner systems to minimize and prevent the migration and transport of VOCs through geomembrane-based liner systems into the groundwater?

Landfill Gas

8. What technologies are available to scrub sulfides and halides from landfills gas? How effective are they? What are the costs? This is important for projects that focus on reforming landfill gas using catalysts. It helps minimize catalyst poisoning and deactivation.
Landfill Leachate

9. What are the chemical characteristics of leachate collected in lined C&D sites, as well as lined Class III sites? This information could be used to evaluate whether the current liner design for these types of facilities is adequate to protect groundwater.

10. This research would examine the chemical nature of Leachate Organic Matter (LOM) to better understand the humification of landfilled waste and the fate of discharged LOM to the environment after in situ landfill treatment, co-treatment at a WWTP, or on-site biological treatment. Recalcitrant LOM production is associated with specific components of solid waste, and the avoidance of these components in future landfills could result in enhanced leachate treatability and reduced treatment cost. The consequences of discharging LOM in treated leachate from existing landfills can be attenuated through passive sunlight-driven photolysis. Specific research questions to be addressed include the following: (1) which waste components contribute to recalcitrant LOM; (2) can we use advanced characterization tools to better understand the potential for LOM biodegradation, photolysis, or contaminant transport; and (3) what is the fate of recalcitrant LOM in aquatic environments (e.g., wetlands and surface waters), with a focus on photolysis?

11. Leachate is often treated at publicly owned wastewater treatment plants (WWTP). Even highly treated leachate has residual organic and nitrogen species that can negatively impact operations at WWTPs. For example humic acids can reduce the transmission and effectiveness of ultraviolet (UV) light used in disinfection of the effluent. Humic acids can also transport metals or other trace organics in the effluent. Organic nitrogen can pass through the WWTP process and lead to exceedances in WWTP effluent. What approaches can be developed to minimize the potential negative impacts of landfill leachate on WWTPs?

Recycling

12. What is the real impact of single stream recycling systems on paper and other recovered fiber materials? Have the recovered fiber materials been contaminated as badly as the paper processors claim? Has the marketability of recovered fiber material been negatively impacted by single stream recycling systems? Why is this research needed? Communities are moving toward single stream recycling to increase the capture of recyclable materials. The fiber industry claims single stream recycling contaminates the recovered paper. If this is true it is possible that paper removed from one community may end up in the landfill of another community. What is the truth?

Policy and Regulation

13. The Subtitle D landfill rules in Florida will be 25-years old next year. What are the lessons learned? How effective have they been in protecting Florida’s groundwater, surface water and other natural resources? Where do we go from here?
Special Wastes

14. Has the amount of chromated copper arsenate (CCA) treated wood in the waste stream increased (as predicted), declined, or remained the same? What are the current technologies regarding possible methods of identifying CCA treated wood, either by stains, X-ray florescence, or other means. The issue is whether there are better methods (new technologies or stains) available now. Are there ways to use the existing screening methods in a cost-effective way to screen the large volumes of material that are received at C&D recycling facilities and wood yards? Has the use of X-ray florescence become less expensive? Has it been used on a large-scale basis in a commercial setting?

Beneficial Use

15. Solid waste materials can be recycled in the road construction sector, especially in Hot-Mix Asphalt (HMA) and Portland Cement Concrete (PCC). Solid waste materials can be used as a supplement or replacement for (a) aggregate or (b) the binders in both HMA and PCC. According to the previous studies, each recycled material has its own material characteristics and has exhibited both beneficial and detrimental effects in HMA and PCC. Combinations of these solid waste materials may be good alternatives. The research questions are how to: (a) evaluate the optimum combination and mix design, (b) evaluate the leaching behavior of the products, and (c) determine the structural performance for HMA and PCC applications.

16. What are the sources of contaminants in compost produced using food waste/yard waste and bio-solids? What are the options for anaerobic digestion of pre and post-consumer food waste?