Funding-Member University Researchers, Offices of Research and Pre-Award Services, and University Representatives to CPBR; December 15, 2014

The Consortium for Plant Biotechnology Research, Inc. ("CPBR"), is issuing the Request for Preproposals for its 2016 competitions.

The RFP is being sent to you as an Adobe Acrobat Portable Document Format ("PDF") file attached to this message. You will need Adobe Acrobat Reader version 3.0 or higher to view it.

Please distribute the RFP to colleagues via email or print and distribute copies as needed. **PLEASE DO NOT** post it for download from a web page. The RFP is copyrighted material for the University's internal distribution only.

The RFP includes several options for navigation. You can go directly to…
- specific sections or pages using the bookmarks and thumbnails; or
- specific text by using Acrobat Reader's Find or Search tools.

CPBR now requires electronic submission of preproposals. Microsoft Word files will be accepted via email. Please compress all images prior to submitting. For assistance, go to http://office.microsoft.com/en-us/help/HP030740421033.aspx. Attached is a Microsoft Word file of the Preproposal Cover Sheet for your convenience.

- Notices of intent to submit a preproposal should be sent to CPBR by **December 5, 2014.**
- Preproposals must be **received** at CPBR no later than **December 19, 2014**.
- Each preproposal must be presented at the 2015 Symposium in Washington, DC, tentatively scheduled for **March 3-4, 2015.**
- Full proposals will be due **June 12, 2015**.
- Industry matching commitments will be due **December 2015**.

If you have any questions about the 2016 competitions, the electronic submission of preproposals, or the Symposium, please contact W. Corey Pittman, Research Grants Coordinator, at (912) 638-4900 or email him at cpittman@cpbr.org.

We look forward to receiving intents to submit preproposals prior to December 5, 2014.

_____

Dorin Schumacher, PhD
Chairman and President
The Consortium for Plant Biotechnology Research, Inc.
P.O. Box 20634
St. Simons Island, GA 31522
Ph: 912-638-4900
Fx: 912-638-7788
info@cpbr.org
www.cpbr.org

THE CONSORTIUM FOR PLANT BIOTECHNOLOGY RESEARCH, INC.

2016 COMPETITION – BIOENERGY AND BIOMASS CONVERSION

PREPROPOSAL COVER SHEET

Principal Investigator's Name:	
Principal Investigator's University:	
Complete Mailing Address:	

Office Phone: _____ **Lab Phone:** _____ **Department Phone:** _____

Cell Phone: _____ **Fax:** _____

Email Address:

University's Congressional District:

Preproposal Title (Make understandable to a non-technical audience. **Limit 55 letters and spaces**.):

Intellectual Property Rights Availability (check one):

Are Available May Be Available Are Not Available

Summary Statement of Project (Make understandable to a non-technical audience):

Economic Benefits of Project (Make understandable to a non-technical audience):

Potential for a start-up company to be based on the proposed innovation.

Duration of Proposed Project: months **Estimated Project Cost:** $

List all Co-PI names, addresses, phone and fax numbers, and email addresses. Use an additional page if necessary:

PI CODE OF CONDUCT AGREEMENT

THIS AGREEMENT is made by and between _____, hereinafter referred to as Principal Investigator, whose address is _____ _____, and The Consortium for Plant Biotechnology Research, Inc., 110 Scranton Connector, Brunswick, Georgia, hereinafter referred to as "CPBR."

Preproposal Title:

_____

_____

NOW THEREFORE, for consideration given, Principal Investigator and CPBR, as parties to this Agreement, do agree as follows:

Confidentiality: Principal Investigator ("PI") agrees to maintain confidentiality of information provided by CPBR related to Preproposals, Proposals, Projects, Principal Investigators ("PI"), Universities, other CPBR Members and the CPBR Process. No written or verbal expression of information on these subjects shall be divulged to third parties, including but not limited to contractors or press, without review of such material and prior written consent by CPBR.

The term "Information" shall not include such portions of the Information which (i) are to become generally available to the public; or (ii) become available from a source other then CPBR or its agents which is not prohibited from disclosing such Information by a legal, contractual, or fiduciary obligation.

Preproposal review: In consideration of the opportunity to enter CPBR's grants competitions, to receive Registrations of Interest in preproposals, and be given the Company contact information to secure matching commitments, PI agrees not to participate in funding outside of CPBR any research preproposal presented in CPBR competitions without written consent from CPBR.

Funding agreements made with any Company or other funding source that excludes CPBR without prior written authorization by CPBR or Registration of Interest will be considered a breach of CPBR Code of Conduct. This may result in the immediate removal from the competition of all the PI's submissions.

Furthermore, PI agrees to report to CPBR any action on the part of a University Representative or Company Representative who suggests alternative negotiations that would exclude CPBR and bypass the CPBR process.

Concerns: PI agrees to bring any CPBR-related concerns directly to CPBR.

IP Negotiations: PI agrees to notify CPBR of any concern related to university members or company members regarding IP negotiations and to adhere to the IP negotiations policy of CPBR. This includes notification of CPBR when an IP agreement between company and university has been reached.

Effective date: This Agreement is effective and binding on each party as of the date of its signature below. This Agreement may be signed in counterparts and by facsimile.

WHERETO the Parties have set their hands on the dates indicated below.

THE CONSORTIUM FOR PLANT BIOTECHNOLOGY RESEARCH, INC.	**PRINCIPAL INVESTIGATOR**
BY:_____	BY: _____
Name: Dorin Schumacher	Name: _____
Title: President	Title: _____
Date: _____	Date: _____

P.O. Box 20634 St. Simons Island, GA 31522 • 110 Scranton Connector, Brunswick, GA 31525
Phone: 912-638-4900 • Fax: 912-638-7788 • E-mail: info@cpbr.org • URL: www.cpbr.org

Co-PI CODE OF CONDUCT AGREEMENT

THIS AGREEMENT is made by and between _____, hereinafter referred to as Co-Principal Investigator, whose address is _____ _____, and The Consortium for Plant Biotechnology Research, Inc., 110 Scranton Connector, Brunswick, Georgia, hereinafter referred to as "CPBR."

Preproposal Title:

_____

_____

NOW THEREFORE, for consideration given, Co-Principal Investigator and CPBR, as parties to this Agreement, do agree as follows:

Confidentiality: Co-Principal Investigator ("Co-PI") agrees to maintain confidentiality of information provided by CPBR related to Preproposals, Proposals, Projects, Principal Investigators ("PI"), Universities, other CPBR Members and the CPBR Process. No written or verbal expression of information on these subjects shall be divulged to third parties, including but not limited to contractors or press, without review of such material and prior written consent by CPBR.

The term "Information" shall not include such portions of the Information which (i) are to become generally available to the public; or (ii) become available from a source other then CPBR or its agents which is not prohibited from disclosing such Information by a legal, contractual, or fiduciary obligation.

Preproposal review: In consideration of the opportunity to enter CPBR's grants competitions, to receive Registration of Interest in preproposals, and be given the Company contact information to secure matching commitments, Co-PI agrees not to participate in funding outside of CPBR any research preproposal presented in CPBR competitions without written consent from CPBR.

Funding agreements made with any Company or other funding source that excludes CPBR without prior written authorization by CPBR or Registration of Interest will be considered a breach of CPBR Code of Conduct. This may result in the immediate removal from the competition of all the Co-PI's submissions.

Furthermore, Co-PI agrees to report to CPBR any action on the part of a University Representative or Company Representative who suggests alternative negotiations that would exclude CPBR and bypass the CPBR process.

Concerns: Co-PI agrees to bring any CPBR-related concerns directly to CPBR.

IP Negotiations: Co-PI agrees to notify CPBR of any concern related to university members or company members regarding IP negotiations and to adhere to the IP negotiations policy of

CPBR. This includes notification of CPBR when an IP agreement between company and university has been reached.

Effective date: This Agreement is effective and binding on each party as of the date of its signature below. This Agreement may be signed in counterparts and by facsimile.

WHERETO the Parties have set their hands on the dates indicated below.

THE CONSORTIUM FOR PLANT BIOTECHNOLOGY RESEARCH, INC.	**CO-PRINCIPAL INVESTIGATOR**
BY:_____	BY: _____
Name: Dorin Schumacher	Name: _____
Title: President	Title: _____
Date: _____	Date: _____

The Consortium for Plant Biotechnology Research, Inc.

2015 SYMPOSIUM REGISTRATION

Please print clearly:

Name:	**Email:**	
Affiliation/University:		
Address:		
City:	**State:**	**Zip:**
Phone:	**Fax:**	

Anticipated Symposium - March 3-4, 2015: (Provided: breakfasts, lunches, coffee breaks & 3/3 p.m. reception)

Category	Through 1/31/2015	After 1/31/2015	Payment Amount
Non-member company	$2,000	$2,250	$
Member company	$1,000	$1,250	$
Government/Association	$500	$600	$
University**	$200	$250	$

**A PI who does not have current CPBR funding and is presenting a preproposal poster is eligible for travel assistance of up to $400. **

HOTEL RESERVATIONS: It is important to make hotel reservations ASAP as there is no symposium hotel and this is a very busy time in DC.

Payment Options

Make checks payable to CPBR, Inc.

Credit Card: ☐ Visa ☐ AMEX ☐ MC

Cardholder Name:	
Billing Address:	
Card Number:	**Expiration Date:**
Security Number:	
Signature:	

Cancellation Policy: Cancellation notices must be made in writing via fax or email. Cancellations received on or before Wednesday, **February 20, 2015** are eligible for a refund less a $75 administrative fee. No shows are responsible for the full amount due. You may send a substitute in your place. Please fill out a registration form for the substitute registrant and clearly indicate the full name of the original registrant.

Please FAX or mail this form (see below)

(A confirmation notice will be sent once registration is processed.)

P.O. Box 20634 St. Simons Island, GA 31522 • 110 Scranton Connector, Brunswick, GA 31525

Phone: 912-638-4900 • Fax: 912-638-7788 • E-mail: info@cpbr.org • URL: www.cpbr.org

The Consortium for Plant Biotechnology Research

(For internal use only. Do not post on the Internet.)

2016
Research Grants Competition

Bioenergy and Biomass conversion
from plant-based research to prototype bio-materials

Request for Preproposals
Preproposal Deadline: December 19, 2014

TABLE OF CONTENTS

2016 Competition
Bioenergy and Biomass Conversion

FROM PLANT-BASED RESEARCH TO PROTOTYPE BIO-MATERIALS

REQUEST FOR PREPROPOSALS
SUBMISSION DEADLINE: DECEMBER 19, 2014

ABOUT CPBR

The Consortium for Plant Biotechnology Research, Inc. ("CPBR") is a non-profit organization that funds university peer-reviewed research on a competitive basis. CPBR facilitates research interactions among university and industry scientists. Member organizations include universities, companies and trade associations. Industry sectors represented include the seed, agrochemical, forestry, energy, bio-materials, and other food and non-food agricultural products industries.

RESEARCH AREAS

Preproposals are invited for research that (1) is related to plant biotechnology and (2) addresses industrial problems and opportunities related to bioenergy and biomass conversion. A specific interest in this year's Competition will be centered around opportunities for the development of startup companies based on proposed innovation.

Funding for CPBR research for **2016** may come from the U.S. Department of Energy ("DOE") and/or other sources. Preproposal writers should review the information provided in Appendix 1 (page 13) concerning the missions and goals of DOE.

COMPETITION SCHEDULE

Notice of intent to submit a preproposal ..... *December 5, 2014*
Preproposals and Symposium registrations due ..... December 19, 2014
Company members review preproposals ..... January-February, 2015
Preproposals presented in person at Symposium (tentative dates) .....March 3-4
Companies complete evaluations and their Registrations of Interest in preproposals.....March
Invitations for full proposals issued .....early April
PIs/Universities invite competitive bids for matching funds ..... May-June
Full proposals due for peer review.....June 12
Final matching funds confirmations due ..... December
Project recommendation .....December (or later)
*Projects start ..... January 1, **2016** (or later)*

ELIGIBILITY

Investigators from CPBR member universities are eligible to participate in the competitions. Investigators from any other U.S. university may participate through collaboration with a principal investigator ("PI") at a CPBR member university. There is no limit on the number of preproposals submitted per eligible PI.

CODE OF CONDUCT

Preproposal submitters must agree to comply with CPBR's Code of Conduct related to the submission of preproposals (see Appendix 5). Preproposal submissions should include signed Code of Conduct Agreements for each PI and Co-PI participating.

PROJECT DURATION AND SIZE

One- or two-year projects are requested. Second year funding is subject to scientific progress, feedback from matching companies, and availability of CPBR and matching funds. CPBR awards have ranged from $20,000 to $185,000/year, and have been matched with equal or larger amounts from industry, universities and other non-federal sources.

THE MATCHING REQUIREMENTS

CPBR funds requested must be matched at least 1:1 with non-federal funds. PIs are responsible for securing matching funds commitments for their full proposals, which commitments will be due December 2015. The match may come from industry, state or local government, foundations, universities, etc., but some portion must be cash matching from industry (*i.e.,* a for-profit company or trade or commodity association). Universities may not charge IDC on the industry matching funds.

Industry cash matching is essential as it represents an independent, objective evaluation of the potential economic value of the proposed research. The company(ies) committing to match must be CPBR members or must agree to join CPBR or pay an administrative fee of 25 percent of the total project cost. ***NB: Matching funds commitments are not required at the preproposal stage nor are they required by the full proposal submission deadline.*** **The deadline for industry cash matching commitments is December 2015.**

In-kind (non-cash) support from a company will not be counted as the required industry cash match. However, if a company plans to provide significant technical assistance deemed essential to the completion of the project, a description of such assistance may strengthen the proposal in the eyes of peer reviewers.

CPBR makes every effort to protect the identity of companies committing matching funds. Their names may be listed as a group for purposes such as federal and state reporting, but the names are not associated with specific projects. The Project Recommendation Committee is not given the names of the matching companies--just the amounts of match committed to each proposal.

A match described as "up to" a certain dollar amount will not be accepted as a commitment to match. The specific dollar amount committed must be stated, and it must be a firm commitment. A sample company matching commitment letter is attached (Appendix 6).

Because most companies require several months to make matching funding decisions, PIs should contact potential industrial sources of matching funds early. Companies do not function like federal funding agencies and should not be approached as such. PIs are advised to approach companies as potential research co-creators and to point out the leveraging that CPBR funds can provide for company R&D funds. For a free copy of Dorin Schumacher's how-to book, *Get Funded! A Practical Guide for Scholars Seeking Research Support from Business,* contact CPBR.

REVIEW PROCESS

CPBR implements a two-stage review process.

Stage One: Preproposals are reviewed for industrial relevance and potential practical applications by CPBR's member companies. Member companies may register interest in a preproposal in accordance with CPBR's policy on competitive bidding (see page 14). PIs whose preproposals are deemed relevant will be invited to submit full proposals.

Stage Two: Full proposals are peer reviewed for scientific merit.

Final selection of full proposals will be based primarily on peer review scores. Also considered will be the fit with the needs of industry and CPBR's sponsoring agency(ies), the industrial matching funds commitments, and the availability of CPBR funds.

INDUSTRIAL REVIEW FOR RELEVANCE

CPBR will send the preproposals in PDF format to member company representatives. The company evaluations will be returned to CPBR following the anticipated 2015 Symposium, where company representatives will have had the opportunity to talk one-on-one with PIs and develop co-creator relationships.

With regard to preproposal content, company representatives prefer to have clear statements of (1) objectives and (2) expected outcomes. They are not looking for details of the research methodology. Because of the diverse expertise of company representatives and because preproposals may be circulated for review within a company, the language of a

preproposal should be clear and understandable to non-scientists. Preproposals should not include sensitive or proprietary information.

CPBR'S 2015 SYMPOSIUM

PIs participating in the 2016 competitions must present their preproposals as posters at 2015 Symposium, which is tentatively scheduled for March 3 & 4, 2015, at The George Town Club, 1530 Wisconsin Avenue N.W., Washington, DC 20007. It is important that PIs make their own hotel reservations early. Washington will be extremely busy during this time. Reservations can always be cancelled later.

The Symposium will provide university scientists with the opportunity to meet industry scientists and to attract matching fund commitments. Travel assistance of up to $400 is available to university investigators who present a preproposal poster and do not have current CPBR funding. Reimbursement guidelines will be emailed to registrants who are eligible for assistance and will also be available at the Symposium registration desk. Further information will be provided with Symposium announcements.

SYMPOSIUM REGISTRATION

Please complete one registration form and return it with your preproposal(s). For planning purposes, we need to know who will be attending the Symposium and what the poster topics will be.

COMPANY REVIEWS: REGISTRATION OF INTEREST IN PREPROPOSALS AND BIDDING FOR RIGHTS TO INTELLECTUAL PROPERTY

A member company may register interest in a preproposal on the *Industrial Preproposal Evaluation Form* and return it to CPBR. For the definition of "Registration of Interest," see the CPBR policy, *Registration, Notice and Bidding for Exclusive Rights to Intellectual Property Developed through CPBR Funding* (Appendix 2). CPBR will inform each PI of the identity and contact information for all companies that register interest in the PI's preproposal.

When two or more qualified companies register interest in the same preproposal and desire exclusivity, the PI and his/her university must follow CPBR's policy to insure a process of orderly and fair bidding. The policy requires the PI or other university official to notify in writing each qualified company that desires exclusivity that another qualified company has submitted a Registration of Interest and wishes exclusivity. All interested qualified companies must be so notified and must be given an equal opportunity to bid and negotiate for desired intellectual property rights and/or options.

MINORITY COLLABORATIONS

PIs are strongly encouraged to establish research and educational collaborations with scientific colleagues at minority institutions such as Historically Black Universities, Hispanic and Native American institutions. For information and assistance in establishing such collaborations, contact CPBR.

NOTICE OF INTENT

PIs should send notice to CPBR, via email (info@cpbr.org) stating they plan to participate in the 2016 competition. Notice of intent should include name and university of PI and Co-PI(s), number of preproposals planning to submit and title(s) if available.

PREPROPOSAL SUBMISSION

Each preproposal package should contain the following items:

- CPBR Preproposal Cover Sheet (Appendix 3, also available as a Word file)
- Project Summary
- Code of Conduct Agreement for each PI and CoPI participating (Appendix 5, also available as a Word file)
- Symposium Registration Form (Appendix 4, also available as a Word file)
- Draft poster
- Photos of PI and each Co-PI

The project summary should include, in two or three single-spaced pages:

- Preproposal title
- Objectives
- Anticipated outcomes
- Discussion of the perceived economic value or potential commercial applications
- Discussion of containment if GM plants are used

CPBR requests electronic submission of preproposals as Word documents. These must be sent as email attachments, to info@cpbr.org, **Please compress all images prior to submitting.**

All electronic submission of preproposals, must be received **in Word Format** at CPBR by **5:00 p.m., December 19, 2014.** Three hard copy signed submissions should be sent to:

W. Corey Pittman, Research Grants Coordinator
The Consortium for Plant Biotechnology Research, Inc.
P.O. Box 20634
St. Simons Island, GA 31522

Express Delivery
110 Scranton Connector
Brunswick, GA 31525

Phone: 912-638-4900
Fax: 912-638-7788
Email: cpittman@cpbr.org
URL: www.cpbr.org

CPBR will acknowledge receipt of preproposals by email.

CPBR MEMBER UNIVERSITIES AND REPRESENTATIVES AND MEMBER COMPANIES

UNIVERSITIES	REPRESENTATIVE
Arkansas State University	Elizabeth Hood
Clemson University	George Askew
Dartmouth College	Lee Lynd
Donald Danforth Plant Science Center	Karla Goldstein
Florida State University	Henry Bass
Georgia Institute of Technology	Gerald Pullman
Indiana University	Scott Michaels
Iowa State University	William Beavis
Kansas State University	Ernest Minton
Louisiana State University	TBD
Michigan State University	Ian Gray
Michigan Technological University	Chandrashekhar Joshi
Montana State University	Thomas McCoy
New Mexico State University	Abbas Ghassemi
North Carolina State University	Steven Lommel
North Dakota State University	David Dai
Northwestern University	Michael Green
Oregon State University	Richard Spinrad
Purdue University	Karen Plaut
Rutgers, The State University of New Jersey	Yair Harel
South Dakota State University	Thomas Cheesbrough
Southern Illinois University	David Lightfoot
SUNY ESF	William Powell
Syracuse University	John Russell
Texas AgriLife Research	Bill McCutchen
The Ohio State University	F. Robert Tabita
The Pennsylvania State University	Bruce McPheron
University of Chicago	Gayle Lamppa
University of Colorado	Stein Sture
University of Connecticut	Yi Li
University of Florida	James Preston
University of Georgia	David Lee
University of Hawaii	Michael Antal
University of Illinois	John Juvik
University of Iowa	TBD
University of Kentucky	William Schweri
University of Massachusetts	Steven Goodwin
University of Michigan	John Thomas
University of Minnesota	Susan Gibson
University of Missouri	Marc Linit
University of Nebraska	Donald Weeks
University of Tennessee	Zong Ming (Max) Cheng
University of Toledo	Frank Calzonetti
University of Washington	Mary Lidstrom
University of Wisconsin	Kathryn VandenBosch

COMPANIES

Archer Daniels Midland Company
Ashland Specialty Chemical Company
BASF Plant Science
Bayer CropScience
ButylFuel, LLC
Cellectis Plant Sciences
Corn Marketing Program of Michigan
D-Helix
Dow AgroSciences, LLC/AgroFresh, Inc.
DuPont Agricultural Biotechnology
FuturaGene, Inc.
Hawaii Agricultural Research Center
Huntsman International, LLC
Iowa Soybean Association
Mascoma Corporation
MeadWestvaco Corporation
Minnesota Soybean Research & Promotion Council
Monsanto Company
The Peanut Foundation
SuGanit Systems, Inc.
Syngenta
Technology Crops International
UniSouth Genetics, Inc.
United States Golf Association

"BREAKING NEWS" -- SOME LATEST INDUSTRIAL RESEARCH NEEDS AS OF FALL 2014

CPBR invited member companies to submit a short summary of current research needs. Those received are presented below without the company identification.

Company 30
We are interested in plant biotechnology and genomics related to improving overall productivity of key crops. Within this arena, novel genes and genetic techniques that have a positive impact on yield, abiotic stress tolerance, nitrogen utilization, nematode control, insect control, disease control, and herbicide tolerance are of interest. Enabling technologies that could help us achieve the above goals are being pursued, such as improved plant transformation, novel cloning technologies, epigenetic analysis, high-efficiency expression systems, protein design, rapid detection methods related to protein and nucleic acids, bioinformatics and computational tools, automated environmental sensing, imaging from micro- to macro-scale, and field deployable analytical methods. Plant breeding technologies are sought which would improve and reduce time, such as new breeding tools and methods, di-haploid seed production, in-silico modeling capabilities, automated plant phenotyping technologies, and in-field analytic methods/robotics. We are also interested in chemical and microbial technologies for use in seed treatments that could help control insects, nematodes, diseases, improve stress resistance and produce a positive overall plant health benefit.

Company 74
Company's interest include providing solutions that improve crop protection and deliver new and improved agricultural outputs for a multitude of food and feed uses. Company offers a wide array of proprietary genetics to develop top-performing seeds, as well as a full range of seeds for corn, sunflowers, canola, cotton, soybeans and alfalfa.

Company 88
Our company is interested in funding proposals that provide original solutions to increase the potential yield of major agronomic crops such as cereals, soybean, canola and cotton. Currently we have a limited interest in bio-energy proposals and in beyond-the-farm products. New technological developments of all kinds and the possibility to interact with top performing academic labs are also considered.

Company 177
Our company is an agricultural biotechnology company with the mission to develop next generation crop plants through targeted genome modification. Primary focus is to advance proprietary genome engineering technology for plant agriculture and to develop new traits through precise genome modification.
In the next few years, our company is particularly interested in projects focusing on the following research areas:

- Development of novel or improved plant transformation technology that has potential to ease regulatory hurdles from government agencies.
- Development of methods to increase targeted gene modification efficiency in plants
- Identification of key genes involved in valuable agronomic and nutritional traits, such as yield enhancement, disease resistance, drought tolerance, herbicide tolerance, enhanced nitrogen utilization and improved nutrient composition.

Company 178
We are interested in better understanding the function of genes and genomes of monocot (grass) species to be used for the production of biofuels and biopower. We are focused on research beyond discovery - translational research to validate economic and environmental value of traits in crops like sorghum, switchgrass, and miscanthus (or appropriate model species). Approaches to improve biomass yield, stress tolerance, and conversion efficiency by non-transgenic and transgenic approaches are of interest. As a private enterprise, all efforts are focused on the development of commercial products.

Company 182
Our company continues to have broad interest in renewable chemicals. Of particular interest are alcohols, amines, isocyanates, and other chemicals capable of being reactively incorporated into polyurethanes, as well as chemicals used as additives, for example, UV-stabilizers, plasticizers and antioxidants. It is of interest that all of these products be derived from non-food competitive crops or side-streams of industrial and/or biorefining

processes. The incorporation of such chemicals into polyurethane systems, as well as measuring and benchmarking their properties against traditional materials would also be of interest in a proposal.

Company 184
Reduce yield loss of soybean from biotic and abiotic stress.

Company 188
Research relevant to the phenotypic and genotypic data of peanut including the identification of trait marker genes. Additionally bioinformatic systems to house the data and a software system to aid breeders in using the data to develop improved varieties.

Company 190
Our company has patented and licensed several technologies in the deconstruction of lignocellulosic materials to give a robust sugar platform. Our patented Ionic Liquid pretreatment technology gives glucose yields higher than 90% from cellulose and 70 to 80% xylose from hemicelluloses. Multiple feedstock, i.e. hardwoods (poplar, oak), softwoods (pine), agricultural residue (corn stover, wheat straw) and energy crops (switch grass) have been evaluated with consistent results. We are currently in the process of setting up a pilot plant facility which will process 1 ton/day biomass to test our technology. The enzymatic hydrolysate from pretreated lignocellulosic material yields a mixture of C6 and C5 sugars which are currently fermented to ethanol and succinic acid. Our current interest is to expand this portfolio of products to other fuels and/or bulk chemicals chemically or via fermentation.

Another area of interest to our company is the development of products from the lignin waste stream generated during our process. Since our pretreatment technology requires mild temperature and pressure conditions, the lignin produced is similar to native lignin. This provides us a unique and exciting opportunity to develop new/high value products from lignin. Some examples of our research interests are in the usage of lignin (derived from IL pretreatment technology) to make carbon fibers, polymers and/or bulk chemicals.

INDUSTRIAL RESEARCH NEEDS -- 2016 COMPETITIONS - BIOENERGY AND BIOMASS CONVERSION

The following research needs and issues have been identified by CPBR member companies and sponsoring agency representatives.

AGROCHEMICALS

1. Fate of agrochemicals, including biological/ microbial pesticides, with emphasis on environmental impact:
   - factors that influence detoxification in soil or water
   - fate of agrochemicals in the environment
   - fate of microbial pesticides in the environment
   - pathways of agrochemical metabolism in target organisms
2. Identification of vulnerable target sites:
   - gene products which influence agronomically important traits
   - molecular targets of herbicide/pesticide/ biopesticide action
   - new genes to confer pest and disease resistance, including those native to the target species
   - pesticidal metabolites from fermentation
3. Mechanisms of resistance to agrochemicals and biological pesticides:
   - detoxification systems in insects
   - herbicide tolerance in crops
   - mechanisms of cross resistance to different agrochemicals and biopesticides
   - strategies to delay development of resistance
4. Microbes affecting crop production:
   - mechanisms determining the host range of entomopathogens
   - microbes for control of insect and nematode pests and for plant pathogens
   - plant pathogens for mycoherbicides
   - survival and spread of microbes
5. Biopesticides and bioherbicides from vegetable oils:
   - lipid biosynthesis
   - transformation
6. Alternatives to agrochemicals to manage loss of biomass crops due to pests and disease:
7. genetic modification of crops to increase resistance to pests and diseases
8. new genes to confer pest and disease resistance, including those native to the target species
9. Mechanisms of plant growth regulation/plant hormones.
10. Development of feedstock chemicals from plants.
11. Novel plant derived chemicals.
12. Isolation of plant enzymes to make chemical products.

BIOMASS CONVERSION

1. Improve biomass conversion to biofuels:
   - analyses of enzymology, biochemistry and genetics of degradation of starch, cellulose, lignin and other plant polysaccharides and determine metabolism of sugars released
   - improve processing economics
   - better, more efficient conversion of 5-carbon sugars and better understanding of pathways
   - convert methanogenic organisms to production of other fuel gases (e.g. propane, butane)
   - genetically modify biomass crops to express enzymes required for conversion to biofuels
   - genetic modification of plant properties which will tailor them to improve processing
   - hydrogen production via gasification
   - improve fractionation/purification of fermentation products
   - improve industrial fermentation organisms (optimize growth rate, ethanol and other product/byproduct tolerance, thermo tolerance, robustness, tolerance to shear and other physical stress)
   - improve physical and enzymatic pretreatment of cellulosic materials to improve conversion efficiency
   - improve physical properties and catalytic efficiency of conversion enzymes through protein engineering
   - improve rates of enzymatic hydrolysis of cellulose
   - use thermophilic bacteria as sources of thermally stable enzymes for biomass conversion
2. Identify and develop uses of biomass to conserve petroleum fuels:
   - biodiesel, utilization of byproducts
   - ethanol, utilization of byproducts
   - catalytic conversion of syngas to ethanol
   - develop biodegradable polymers for plastics
   - improve plant components for use as substitutes for petroleum products
   - production of biocarbon/charcoal
3. Develop processes to produce and purify industrially important materials from crops:
   - basic biochemistry of non-food products
   - improve separation technology for production of chemicals by fermentation
   - industrial uses of vegetable oil methyl esters
   - produce and utilize alternative end products from fermentation

The following research needs and issues have been identified by CPBR member companies and sponsoring agency representatives.

BIOMASS CONVERSION (CONT.)

4. Improve utilization of all components of feedstocks:
   - ♦ combination of fermentation and thermochemical technology
   - ♦ energy production from stillage
   - ♦ improve plant components for use as substitutes for petroleum products (detergent additives, biodiesel fuels, lubricants)
   - ♦ identify, quantify, and ameliorate residues—gaseous, liquid and solid phase—generated by the processing of biomass
   - ♦ minimize residues, and/or generate coproducts from residues
5. Biomass for electricity production:
   - ♦ conversion of biomass in sufficient quantities and at a price competitive with conventional fuels used in electricity generation
   - ♦ conversion options for specific feedstocks: gasification, co-firing; combined cycle, fuel flexibility
   - ♦ develop other marketable products from waste material
   - ♦ compare compositional information and suitability of crops for conversion
   - ♦ waste products and byproducts: ash disposal, nitrogen and sulfur oxides, carbon dioxide, scrubber sludge uses

DOWNSTREAM RESEARCH

1. Develop and evaluate commercially feasible bio-based plastics
   - ♦ evaluate physical properties and identify applications for innovative materials
   - ♦ investigate biodegradability of bio-based plastics
   - ♦ development of bio-based polyesters for polyethylene terephthalate (PET) replacement
   - ♦ development and optimization of bio-based polyamides, bio-based polyurethanes, and bio-based thermosetting resins
   - ♦ technologies to increasing production and correspondingly lowering prices for bacterial polymers such as bacterial cellulose and poly(hydroxyalkanoates)s
2. Develop industrial scale, high margin uses for low-cost bio-based co-products and chemicals
   - ♦ demonstrate industrial scale uses for lignin, distiller dry grains and solubles (DDGS)
   - ♦ polymers from isosorbide, cellulose, starch, glycerol- and alcohol-based monomers
3. Identify and develop uses for renewable chemicals.
   - ♦ Bio-based isobutanol
   - ♦ Bio-based farnesene
   - ♦ Bio-based butanediol
   - ♦ Bio-based succinic acid
4. Develop new cleaner chemical processes to replace environmentally unacceptable methods
5. Design new environmentally friendly materials based on renewable resources.
   - ♦ Physical and chemical modification of natural abundant materials
   - ♦ Natural solvents

ENERGY CROP PRODUCTION

1. Identification and development of novel plant materials suitable to serve as biomass feedstock:
   - ♦ alternative renewable energy crops to serve as cellulosic feedstocks
   - ♦ harvestable fruits or transported saps/latexes from long term perennial crops as alternative feedstocks
2. Improve productivity of current biomass crops:
   - ♦ determine microbial interaction with plants
   - ♦ develop pest control biotechnologies
   - ♦ environmental and biological stress systems
   - ♦ genetic modification of biomass crops to increase yield
   - ♦ genetic modification of microorganisms associated with biomass crops
   - ♦ genetically engineer herbicide resistant crops
3. Genetically modify biomass crops to increase suitability as a feedstock:
   - ♦ characterize mechanisms to control the composition of secondary metabolites in biomass crops
   - ♦ determine mechanisms regulating size and composition of carbohydrate pools in plants
   - ♦ increase understanding of the structure, composition and conversion of cell wall components
   - ♦ increase solids content (lower water content) of biomass feedstocks
   - ♦ modify carbohydrate composition of biomass crops to be consistent with conversion process (higher starch level in corn, less lignin in cellulosic feedstocks, shorter chain length in starch, etc.)
   - ♦ modify oil content to produce more optimal balance for specific industrial applications of

The following research needs and issues have been identified by CPBR member companies and sponsoring agency representatives.

ENERGY CROP PRODUCTION (CONT.)

environmentally favorable plant oils (biodiesel, lubricants)

4. Improve sustainability of biomass production:
   - ♦ determine limitations to achieving truly sustainable biomass production
   - ♦ develop methods to produce and harvest biomass crops that minimize soil erosion and promote soil conservation
   - ♦ increase efficiency of Ca+2 and Mg+2 use by plants to minimize demineralization of soil
   - ♦ monoculture problem
5. Develop somatic embryogenesis for woody crops.
6. Biomass for electricity production:
   - ♦ perennials and trees applicable for biomass power utilization
   - ♦ plants with a potential for a high-value co-product that results in relatively large amount of residues available for biomass power
   - ♦ increase yield through genetic or cultural manipulation (biotechnology or bioengineering)
   - ♦ produce biomass in sufficient quantities and at a price competitive with conventional fuels used in electricity production
   - ♦ optimize feedstock growth characteristics: growth rate, energy content/density, biomass density per acre, fertilizer and pesticide requirements, water requirement
   - ♦ optimize feedstock chemical composition: lignin, water, ash, slagging, tradeoff with growth rate and yield, byproduct or coproduct possibilities, relationship between composition and suitability for conversion
   - ♦ optimize other feedstock properties: harvesting, transport, drying, storage, combustion, problem wastes
   - ♦ optimize feedstock availability: seasonality, amount, sustainability

ENABLING BIOTECHNOLOGIES

1. Improve genetics methods:
   - ♦ genetic purity and fingerprinting for plant variety and patenting
   - ♦ genetic tools to enhance traditional breeding of biomass crops
   - ♦ develop genetic maps, especially for biomass crops
2. Improve systems for transformation of agronomic plants:
   - ♦ develop transformation systems, especially in monocots
   - ♦ develop vectors and selectable markers
   - ♦ optimize methods for stable genetic transformation
   - ♦ determine mechanisms regulating gene expression
   - ♦ develop Agrobacterium techniques
   - ♦ develop non-Agrobacterium techniques
   - ♦ gene tagging
   - ♦ improve double haploid production techniques
   - ♦ develop capabilities to transfer multi-gene pathways and clone them into commodity crops
3. Plant propagation and regeneration systems
4. Improved processes for plant cell and tissue culture:
   - ♦ expression of secondary plant metabolites in differentiated tissue culture
   - ♦ induce differentiated callus cultures to produce differentiated secondary tissues
   - ♦ develop immobilized plant cell systems for production of plant products
   - ♦ address scale-up problems of natural products
   - ♦ develop high secretion systems in plant cell culture
5. Characterize molecular mechanisms underlying and controlling agronomically important traits:
   - ♦ develop inducible genetic regulatory systems for syntheses of specialized products in plants that will work in the field as well as in tissue culture
   - ♦ reproductive biology
   - ♦ new genes for stress tolerance
6. Characterize metabolic pathways for synthesis of important plant products and coproducts:
   - ♦ genetic modification of rate-limiting reaction steps
   - ♦ modification of reaction steps to force accumulation of valuable intermediates
   - ♦ modification of enzyme reactions in pathways to produce modified products
7. Gene regulation:
   - ♦ tissue specific and inducible promoters
   - ♦ novel methods of regulating gene expression
   - ♦ sterility and control of sexual reproduction
   - ♦ development of regulatory genes that respond to environmental, chemical, and physical stimuli
8. Determine the metabolism, biochemistry and genetics in plants and animals of plant-synthesized toxins and other undesirable components.

The following research needs and issues have been identified by CPBR member companies and sponsoring agency representatives.

ENABLING BIOTECHNOLOGIES (CONT.)

9. Examine chemistry, biochemistry, and physical properties of plant carbohydrates, proteins, lipids, and metabolites and relate this knowledge to physiology and genetics.
10. Develop stereospecific and regiospecific systems for biotransformation of existing compounds which are synthetically difficult for the production of novel and more efficacious products.
11. Genomics topics.

ENVIRONMENTAL ISSUES

1. Bioremediation/phytoremediation:
   - ♦ bioremediation of marginal lands by biomass crops
   - ♦ use of fungi
   - ♦ evaluation techniques
   - ♦ identify nutrients to improve bioremediation processes
   - ♦ treatment of plant effluent
   - ♦ addition of nutrients to soil-ecology; how to stimulate desirable microorganisms and eliminate undesirable pathogens
   - ♦ phytoremediation of aromatic pollutants and development of elite clone lines
2. Reduction of greenhouse gas emissions:
   - ♦ methods to fix or use carbon dioxide from fermentation
   - ♦ develop fermentations yielding products other than ethanol (e.g., acetone) which may produce less carbon dioxide production as a byproduct
   - ♦ direct conversion of biomass to carbon/charcoal
3. "Fertigation" with wood mill effluent:
   - ♦ use marginal/non productive lands
   - ♦ salt and heavy metal buildup problem
   - ♦ ground water contamination
4. Identify ecological consequences of intensive biomass cropping.
5. Determine environmental impact of deliberate release of genetically modified biomass crops and microorganisms:
   - ♦ assess effects of pollen drift on wild plant relatives;
   - ♦ assess effects of pollen drift on non-target pests;
   - ♦ assess development of resistance in target pests, microbes, and viruses;
   - ♦ assess possible toxicity or immunogenicity of new gene products in food crops;
   - ♦ assess possible toxicity of new gene products in soil and water.
6. Develop methods to prevent escape of introduced genes from engineered crops.
7. Determine cost-differential for conventional breeding "release" versus laboratory genetic modification release.
8. Determine environmental impact of using vegetable oil and animal fats to replace petrochemicals in industrial uses.

FOREST PRODUCTS

1. Pulp and paper:
   - ♦ identify components of post-harvest wood degradation and modify resistance, i.e. extend the "shelf life" of stored wood (to reduce bleaching costs)
   - ♦ reduce energy in pulping process by fiber structure modification--longer, thin-walled fibers
   - ♦ reduced lignin content
   - ♦ extraction of higher-valued chemicals from pulp
   - ♦ methods to approach zero water usage in pulp and paper mill
   - ♦ design a pulp and paper mill with no aqueous, air or solids pollution
   - ♦ methods to automatically sort and handle incoming wastepaper for recycled paper applications
   - ♦ requirements to achieve a low energy, high strength, high brightness, high yield mechanical pulp fiber
   - ♦ zero chlorine bleaching
2. Solid wood products:
   - ♦ increased strength properties
   - ♦ stain resistance
3. Forest crop production:
   - ♦ herbicide tolerance - new genes
   - ♦ insect and disease tolerance - new genes to inhibit insect damage
   - ♦ increased specific gravity
   - ♦ develop more prolific and/or aggressive predators for spruce bud worm on spruce, aspen defoliators (e.g. tent caterpillars)
   - ♦ better propagation: clone (cell/tissue culture) outstanding conifer or deciduous species
   - ♦ discover the role of the major physiological factors in the growth of trees
   - ♦ design efficient clonal forestry system
   - ♦ locate/specify key genetic markers related to tree growth

The following research needs and issues have been identified by CPBR member companies and sponsoring agency representatives.

FOREST PRODUCTS (CONT.)

- ♦ discover the components for a system of intensive cultivation of trees so that optimal growth rates can be achieved

4. Biomass/cogeneration production for short rotation species including hybrid aspen for limiting nutrients (e.g. Ca+2 on forest soils):
   - ♦ extract higher valued products (e.g. alcohols, starches) prior to burning
5. Integration of ecosystems and timber management.
6. Controls on transgenic material introduced into the environment (e.g. male sterility, female sterility, etc.).
7. How to balance genetic gain against propagation efficiency in hard-to-propagate but valuable clones.

PROCESS APPLICATIONS

1. Examination of chemistry, biochemistry, and physical properties of plant carbohydrates, proteins, lipids, and metabolites, and relate this knowledge to physiology, and genetics.
2. Analyses of the enzymology, biochemistry, and genetics of degradation by microorganisms of starch, cellulose, lignin, and other plant polysaccharides, and determine metabolism of sugars released by such degradation.
3. Development of new processes for the production and purification of industrially important materials from crops.
4. Examination of new processes for the modification and conversion of plant materials.
5. Determination of the metabolism, biochemistry, and genetics in plants and animals of plant-synthesized toxins and other undesirable components.
6. Exploration of genetic engineering of plants to improve processing economics.
7. Development of improved processes for plant cell and tissue culture.
8. Fermentation technology.
9. Better separation technology for production of chemicals by fermentation.
10. Reduce energy expenditures in processing.

SEEDS

1. Microbial interaction with seeds:
   - ♦ pathogens
   - ♦ symbionts
   - ♦ stimulants
   - ♦ vigor-enhancing factors from natural products
2. Improved product quality:
   - ♦ germination
   - ♦ manipulation of seed components
   - ♦ long-term seed viability
   - ♦ altered grain composition
   - ♦ improved seed vigor and disease resistance
   - ♦ increased seed yields
   - ♦ new genes to confer pest and disease resistance, including those native to the target species
3. Novel hybrid seed production techniques with or without transformation of cytoplasmic elements.
4. Food-related seed industry interests.
5. Develop artificial seeds via somatic embryogenesis.
6. Expression of enzymes in seeds.

APPENDIX 1: DOE MISSIONS AND GOALS

DOE Bioenergy Topics

Bioenergy technologies use renewable biomass resources to produce an array of energy-related products including liquid, solid, and gaseous fuels, heat, chemicals, and other materials. Bioenergy ranks second (to hydropower) in renewable U.S. primary energy production and accounts for three percent of the primary energy production in the United States. Source of information below: CPBR's DOE program officer and http://www.eere.energy.gov/basics/renewable_energy/biomass.html. Preproposals and proposals in the Energy competition should relate to at least one of the following:

Biomass Resources
The term "biomass" means any plant derived organic matter available on a renewable basis, including dedicated energy crops and trees, agricultural food and feed crops, agricultural crop wastes and residues, wood wastes and residues, aquatic plants, animal wastes, municipal wastes, and other waste materials. As technologies develop to more efficiently process complex feedstocks, the biomass resource base will expand.

Advanced Biofuels*
A variety of fuels can be made from biomass resources, including the liquid fuels ethanol, biodiesel, Fischer-Tropsch diesel, and gaseous fuels such as hydrogen and methane. Advanced biofuels research and development is composed of three main areas: producing the fuels, finding applications and uses of the fuels, and creating a distribution infrastructure.

Biobased Chemicals and Materials
Biobased chemicals and materials are commercial or industrial products, other than food and feed, derived from biomass feedstocks. Biobased products include green chemicals, renewable plastics, natural fibers, and natural structural materials. Many of these products can replace products and materials traditionally derived from petrochemicals, but new and improved processing technologies will be required.

Integrated Bioenergy Systems and Assessments
The economic, social, environmental, and ecological consequences in growing and using biomass are important to understand and consider when addressing technological, market, and policy issues associated with bioenergy systems.

*Advanced biofuel definition from Title II of the Energy Independence and Security Act of 2007:
The term 'advanced biofuel' means renewable fuel, other than ethanol derived from corn starch, that has lifecycle greenhouse gas emissions . . . that are at least 50 percent less than baseline lifecycle greenhouse gas emissions. The types of fuels eligible for consideration as 'advanced biofuel' may include any of the following: (1) Ethanol derived from cellulose, hemicellulose, or lignin; (I2) Ethanol derived from sugar or starch (other than corn starch); (3) Ethanol derived from waste material, including crop residue, other vegetative waste material, animal waste, and food waste and yard waste; (4) Biomass-based diesel; (5) Biogas (including landfill gas and sewage waste treatment gas) produced through the conversion of organic matter from renewable biomass; (6) Butanol or other alcohols produced through the conversion of organic matter from renewable biomass; (7) Other fuel derived from cellulosic biomass.

APPENDIX 2: GUIDELINES FOR COMPETITIVE BIDDING

REGISTRATION, NOTICE, AND BIDDING FOR EXCLUSIVE RIGHTS TO INTELLECTUAL PROPERTY DEVELOPED THROUGH CPBR FUNDING

The Consortium for Plant Biotechnology Research, Inc. ("CPBR") is a partnership between universities and companies. In order to insure fairness to all members in the matter of exclusivity of rights to intellectual property developed through CPBR-funded research projects, these rules have been adopted by the CPBR Board of Directors, effective April 21, 1998. All members and other participants in CPBR competitions, by participating in a competition, agree to abide by these rules.

CPBR requires that any request for CPBR funds be matched 100 percent by non-federal funds, a portion of which must come from industry. CPBR provides its corporate members with the opportunity to provide matching funds in the following way. In the CPBR competition process, preproposals submitted to CPBR are provided to member companies for review. Each qualified company is asked to review each preproposal for such factors as 1) the degree of the company's interest in the research, 2) the company's assessment of the potential for industrial applications and potential for application by the company, 3) scientific merit, and 4) the desire for further discussions with the principal investigator ("PI"). Thus, the companies register their interest in a proposed project by their responses.

In many cases, more than one qualified company may register interest in a proposed project. "Registration of Interest" is defined as a "yes" response by a qualified company to the Industrial Preproposal Evaluation Ballot question, "Do you want the PI to contact you to discuss this project?"

Three levels of company interest are possible: 1) a qualified company may wish to provide matching funds for a project but have no interest in exclusive intellectual property rights in projects funded by CPBR ("exclusivity"); 2) two or more qualified companies may wish to provide matching funds for a project, but one company may want exclusivity in one area of a project and the other company may want exclusivity in another, unrelated area of the project–the companies are not in competition for exclusive rights to the same area; and 3) two or more qualified companies may wish to provide matching funds for a project and all the companies may want exclusivity in the same area. In this case, all the companies are in competition for exclusivity.

In the case of 1) and 2) above, the university may proceed to negotiate with the interested qualified company or companies in its discretion. In the case of 3) above, the university shall proceed in accordance with these rules.

Only member companies may submit a Registration of Interest on a preproposal, except that any non-member company which submits a Registration of Interest to CPBR with a check for annual dues for one year and a completed application for membership shall be considered to have a timely qualified Registration of Interest on file, even if the Board of Directors has not yet acted on its request for membership. Such companies, together with member companies, shall be considered "qualified" companies. The Board of Directors will act promptly on all such requests for membership. In the event the Board of Directors approves the application, it shall be effective from the date of receipt of the check, and if denied, the check will be returned and the application denied.

The companies' Registrations of Interest are kept confidential by the CPBR. CPBR will inform, on a strictly confidential basis, each principal investigator of the identity of all companies that have registered interest in his/her proposed project, and where appropriate or necessary, the areas of the projects that are of interest. The principal investigator will not disclose to any other company the identity of any qualified company that has a Registration of Interest on file for the proposed project. Breach of this confidentiality may lead to automatic rejection of the proposed project and/or constitute a bar to future funding for the investigator and/or university member, in the sole discretion of the CPBR Board of Directors.

In order to insure a process for orderly and fair bidding for exclusivity when two or more qualified companies are in competition for rights to the same area of a project, CPBR requires that, where applicable, each qualified company

desiring exclusivity be notified by the principal investigator or other university official, without identifying the other company or companies, that one or more Registrations of Interest are on file for the proposed project. Each interested qualified company desiring exclusivity must be given an equal opportunity to make its highest and best offer for providing matching funds and for obtaining exclusivity, if desired.

The principal investigator or other university official must notify each qualified company that desires exclusivity (in writing) that another qualified company has a Registration of Interest, without disclosing the identity of such firm, and must give the company the opportunity to make its highest and best offer for such rights, including matching funds and any other support, its request for any exclusivity that is desired, terms of such rights and any other terms it may propose. CPBR must be copied on the letter that is sent to each company requesting its bid. The only Registration of Interest that can block the granting of exclusivity is that of a qualified company.

Exclusivity may not be granted until all interested qualified companies have been notified and have been given an equal opportunity to bid and negotiate for such rights. Universities participating in the competition are prohibited from entering into an exclusive arrangement until they have informed CPBR that they have followed these rules and have negotiated impartially with all interested qualified companies.
In evaluating such assurances, CPBR will take into account such factors as the amount of the match, the duration of the match, other resources to be provided such as equipment, potential applications by the company, the creation of jobs and other economic benefits, and statements by the companies as to the fairness of their treatment by the university. The university reserves the unilateral right to make a decision as to which matching funds and exclusivity offer it will accept. The above procedures and practices are also applicable to second year funding or subgrants to which exclusivity has not yet been assigned in accordance with these rules. In the event of second year funding in which more than one qualified company is interested in providing matching, the university shall negotiate fairly with all interested parties but shall place special emphasis on the company(ies) that supplied first year matching.

No funds will be awarded by CPBR to a university that is in violation of these rules. These rules apply equally to initial and follow-on subgrants. Any protest under these rules will be brought to CPBR for resolution at the staff level.

Companies and universities must abide by these rules as a condition of their continuing membership in CPBR. A university may not grant exclusivity to a non-qualified company unless there are no qualified companies interested in exclusivity. A university can apply to CPBR at any time for a waiver of these rules based on unique circumstances.

Letter of Notice of Bidding for Exclusivity Opportunity

(Name of Representative of Qualified Company)
(Qualified Company Name)
Address

Re: (Project name) (Principal Investigator Name)

Dear (Name of Representative),

The Consortium for Plant Biotechnology Research, Inc. ("CPBR") has informed me/us that your company has registered interest in the referenced project.

This is to inform you that another qualified company has registered interest in the referenced project. In order to insure a fair and impartial bidding process, (university name) is hereby giving you the opportunity to make an offer of matching funds and to request whatever exclusivity of intellectual property you may wish. The other qualified company(ies) that has(have) registered interest in this project will be given the same opportunity at the same time to make a bid. (University name) will give each company making an offer and a bid the opportunity to mutually negotiate for such rights.

Your best and final matching funds offer and request for exclusivity must be received by (date). (University name), as a member of CPBR, will make a determination as to which offer is in the best interest of the principal investigator, the university and CPBR, and will provide assurances to CPBR that this has been done. Such factors as the amount of the match, the duration of the match, other resources to be provided such as equipment, potential applications by the company, the potential creation of jobs and other economic benefits, the testimony by the companies as to the fairness of their treatment by the university will be taken into account by CPBR. [A past match provided by your company, if any, on this project will be accorded more weight than other factors in this consideration.]

Please inform me in writing by (date) of the amount of matching funds you are offering, any special terms of the match and what interest you have in exclusivity. If I do not hear from you by then, I will assume you are not interested in participating in such bidding and will proceed accordingly.

Sincerely,

University Official or Principal Investigator

PROCEDURES TO BE FOLLOWED BY PRINCIPAL INVESTIGATORS FOR THE IMPLEMENTATION OF REGISTRATION, NOTICE, AND BIDDING FOR EXCLUSIVE RIGHTS TO INTELLECTUAL PROPERTY DEVELOPED THROUGH CPBR FUNDING

1) At the start of each CPBR competition, principal investigators shall indicate on their preproposals and on their preproposal posters the potential availability of exclusive intellectual property rights.

2) If such rights are still available, PI's will follow the CPBR rules for Registration, Notice, and Bidding for Exclusive Rights to Intellectual Property Developed through CPBR Funding ("Rules").

3) When the PI is notified of a qualified company's Registration of Interest, he/she will send or cause to be sent to that company the Letter of Notice of Bidding for Exclusivity Opportunity, with a copy to CPBR.

4) The bidding will be handled in accordance with the Rules.

5) The same procedures will be followed for Year Two funding applications and any subgrants where more than one qualified company registers interest.

PROCEDURES TO BE FOLLOWED BY UNIVERSITY OFFICIALS FOR THE IMPLEMENTATION OF REGISTRATION, NOTICE, AND BIDDING FOR EXCLUSIVE RIGHTS TO INTELLECTUAL PROPERTY DEVELOPED THROUGH CPBR FUNDING

1) At the start of each CPBR competition, principal investigators shall indicate on their preproposals and on their preproposal posters the potential availability of exclusive intellectual property rights.

2) If such rights are still available, the university will follow the CPBR rules for Registration, Notice, and Bidding for Exclusive Rights to Intellectual Property Developed through CPBR Funding ("Rules").

3) When the PI is notified of a qualified company's Registration of Interest, a university official will send or cause to be sent to that company the Letter of Notice of Bidding for Exclusivity Opportunity, with a copy to CPBR.

4) The bidding will be handled in accordance with the Rules.

5) The same procedures will be followed for Year Two funding applications and any subgrants where more than one qualified company registers interest.

PROCEDURES TO BE FOLLOWED BY COMPANIES FOR THE IMPLEMENTATION OF REGISTRATION, NOTICE, AND BIDDING FOR EXCLUSIVE RIGHTS TO INTELLECTUAL PROPERTY DEVELOPED THROUGH CPBR FUNDING

1) At the start of each CPBR competition, principal investigators ("PI's") shall indicate on their preproposals and on their preproposal posters the potential availability of exclusive intellectual property rights.

2) A qualified company may file a Registration of Interest by giving a "yes" response to the Industrial Preproposal Evaluation Ballot question, "Do you want PI to contact you to discuss this project?"

3) If more than one qualified company files a Registration of Interest for a particular project, each company will receive from the principal investigator or university a Letter of Notice of Bidding for Exclusivity Opportunity ("Letter").

4) When the qualified company receives the Letter, it will, if it so desires, enter into the bidding by making an offer of matching funds, other resources, and a request for any exclusivity it desires.

5) The university will give each qualified company making an offer and a bid the opportunity to mutually negotiate for such rights.

6) The same procedures will be followed for Year Two funding applications and any subgrants where more than one qualified company files a Registration of Interest for the project.

APPENDIX 3: PREPROPOSAL COVER PAGE

THE CONSORTIUM FOR PLANT BIOTECHNOLOGY RESEARCH, INC.

2016 COMPETITION – BIOENERGY AND BIOMASS CONVERSION
PREPROPOSAL COVER SHEET

Principal Investigator's Name:	
Principal Investigator's University:	
Complete Mailing Address:	

Office Phone: _____ **Lab Phone:** _____ **Department Phone:** _____

Cell Phone: _____ **Fax:** _____

Email Address:

University's Congressional District:

Preproposal Title (Make understandable to a non-technical audience. **Limit 55 letters and spaces**.):

Intellectual Property Rights Availability (check one):

Are Available May Be Available Are Not Available

Summary Statement of Project (Make understandable to a non-technical audience):

Economic Benefits of Project (Make understandable to a non-technical audience):

Potential for a start-up company to be based on the proposed innovation.

Duration of Proposed Project: months **Estimated Project Cost:** $

List all Co-PI names, addresses, phone and fax numbers, and email addresses. Use an additional page if necessary:

APPENDIX 4: 2015 SYMPOSIUM REGISTRATION

Please print clearly:

Name:	**Email:**	
Affiliation/University:		
Address:		
City:	**State:**	**Zip:**
Phone:	**Fax:**	

Anticipated Symposium - March 3-4, 2015: (Provided: breakfasts, lunches, coffee breaks & 3/3 p.m. reception)

Category	Through 1/31/2015	After 1/31/2015	Payment Amount
Non-member company	$2,000	$2,250	$
Member company	$1,000	$1,250	$
Government/Association	$500	$600	$
University**	$200	$250	$

**A PI who does not have current CPBR funding and is presenting a preproposal poster is eligible for travel assistance of up to $400. **

HOTEL RESERVATIONS: It is important to make hotel reservations ASAP as there is no symposium hotel and this is a very busy time in DC.

Payment Options

Make checks payable to CPBR, Inc.

Credit Card: ☐ Visa ☐ AMEX ☐ MC

Cardholder Name:

Billing Address:

Card Number: **Expiration Date:**

Security Number:

Signature:

Cancellation Policy: Cancellation notices must be made in writing via fax or email. Cancellations received on or before Wednesday, **February 20, 2015** are eligible for a refund less a $75 administrative fee. No shows are responsible for the full amount due. You may send a substitute in your place. Please fill out a registration form for the substitute registrant and clearly indicate the full name of the original registrant.

Please FAX or mail this form (see below)

(A confirmation notice will be sent once registration is processed.)

P.O. Box 20634 St. Simons Island, GA 31522 ▪ 110 Scranton Connector, Brunswick, GA 31525

Phone: 912-638-4900 ▪ Fax: 912-638-7788 ▪ E-mail: info@cpbr.org ▪ URL: www.cpbr.org

APPENDIX 5: CPBR CODE OF CONDUCT AGREEMENT

PI CODE OF CONDUCT AGREEMENT

THIS AGREEMENT is made by and between _____, hereinafter referred to as Principal Investigator, whose address is _____
_____,
and The Consortium for Plant Biotechnology Research, Inc., 110 Scranton Connector, Brunswick, Georgia, hereinafter referred to as "CPBR."

Preproposal Title: _____
_____

NOW THEREFORE, for consideration given, Principal Investigator and CPBR, as parties to this Agreement, do agree as follows:

Confidentiality: Principal Investigator ("PI") agrees to maintain confidentiality of information provided by CPBR related to Preproposals, Proposals, Projects, Principal Investigators ("PI"), Universities, other CPBR Members and the CPBR Process. No written or verbal expression of information on these subjects shall be divulged to third parties, including but not limited to contractors or press, without review of such material and prior written consent by CPBR.

The term "Information" shall not include such portions of the Information which (i) are to become generally available to the public; or (ii) become available from a source other then CPBR or its agents which is not prohibited from disclosing such Information by a legal, contractual, or fiduciary obligation.

Preproposal review: In consideration of the opportunity to enter CPBR's grants competitions, to receive Registrations of Interest in preproposals, and be given the Company contact information to secure matching commitments, PI agrees not to participate in funding outside of CPBR any research preproposal presented in CPBR competitions without written consent from CPBR.

Funding agreements made with any Company or other funding source that excludes CPBR without prior written authorization by CPBR or Registration of Interest will be considered a breach of CPBR Code of Conduct. This may result in the immediate removal from the competition of all the PI's submissions.

Furthermore, PI agrees to report to CPBR any action on the part of a University Representative or Company Representative who suggests alternative negotiations that would exclude CPBR and bypass the CPBR process.

Concerns: PI agrees to bring any CPBR-related concerns directly to CPBR.

IP Negotiations: PI agrees to notify CPBR of any concern related to university members or company members regarding IP negotiations and to adhere to the IP negotiations policy of CPBR. This includes notification of CPBR when an IP agreement between company and university has been reached.

Effective date: This Agreement is effective and binding on each party as of the date of its signature below. This Agreement may be signed in counterparts and by facsimile.

WHERETO the Parties have set their hands on the dates indicated below.

THE CONSORTIUM FOR PLANT BIOTECHNOLOGY RESEARCH, INC.	**PRINCIPAL INVESTIGATOR**
BY:_____	BY: _____
Name: Dorin Schumacher	Name: _____
Title: President	Title: _____
Date: _____	Date: _____

Co-PI CODE OF CONDUCT AGREEMENT

THIS AGREEMENT is made by and between _____, hereinafter referred to as Co-Principal Investigator, whose address is _____
_____,
and The Consortium for Plant Biotechnology Research, Inc., 110 Scranton Connector, Brunswick, Georgia, hereinafter referred to as "CPBR."

Preproposal Title: _____
_____

NOW THEREFORE, for consideration given, Co-Principal Investigator and CPBR, as parties to this Agreement, do agree as follows:

Confidentiality: Co-Principal Investigator ("Co-PI") agrees to maintain confidentiality of information provided by CPBR related to Preproposals, Proposals, Projects, Principal Investigators ("PI"), Universities, other CPBR Members and the CPBR Process. No written or verbal expression of information on these subjects shall be divulged to third parties, including but not limited to contractors or press, without review of such material and prior written consent by CPBR.

The term "Information" shall not include such portions of the Information which (i) are to become generally available to the public; or (ii) become available from a source other then CPBR or its agents which is not prohibited from disclosing such Information by a legal, contractual, or fiduciary obligation.

Preproposal review: In consideration of the opportunity to enter CPBR's grants competitions, to receive Registration of Interest in preproposals, and be given the Company contact information to secure matching commitments, Co-PI agrees not to participate in funding outside of CPBR any research preproposal presented in CPBR competitions without written consent from CPBR.

Funding agreements made with any Company or other funding source that excludes CPBR without prior written authorization by CPBR or Registration of Interest will be considered a breach of CPBR Code of Conduct. This may result in the immediate removal from the competition of all the Co-PI's submissions.

Furthermore, Co-PI agrees to report to CPBR any action on the part of a University Representative or Company Representative who suggests alternative negotiations that would exclude CPBR and bypass the CPBR process.

Concerns: Co-PI agrees to bring any CPBR-related concerns directly to CPBR.

IP Negotiations: Co-PI agrees to notify CPBR of any concern related to university members or company members regarding IP negotiations and to adhere to the IP negotiations policy of CPBR. This includes notification of CPBR when an IP agreement between company and university has been reached.

Effective date: This Agreement is effective and binding on each party as of the date of its signature below. This Agreement may be signed in counterparts and by facsimile.

WHERETO the Parties have set their hands on the dates indicated below.

THE CONSORTIUM FOR PLANT BIOTECHNOLOGY RESEARCH, INC.	**CO-PRINCIPAL INVESTIGATOR**
BY:_____	BY: _____
Name: Dorin Schumacher	Name: _____
Title: President	Title: _____
Date: _____	Date: _____

APPENDIX 6: SAMPLE MATCH SOURCE COMMITMENT LETTER

SAMPLE MATCHING
COMMITMENT LETTER

Company Letterhead

Company Representative
Address

Date

Dr. Principal Investigator
Address
-

Dear Dr. PI:

Company X will provide $_____ cash match for Year One and $_____ cash match for Year Two for your project, "*A very good project*," subject to funding by CPBR.

We will pay directly to CPBR ten (10) percent of both the Year One and the Year Two match as a commercialization fee. The remaining ninety (90) percent will be sent directly to the University for the above-referenced project. We understand no indirect costs will be charged by the University on our company's match.

The Year One commercialization fee will be sent to CPBR upon receipt of its invoice, and the Year Two commercialization fee will be sent to CPBR when it notifies us that your Year Two funding has been approved.

We will maintain continued membership in CPBR for the full project period, as is required.

We thank you for the opportunity to collaborate with you and your research team.

Regards,

Company Representative
Company X

