

NSF EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH  
(EPSCoR) – Award #1430427

“Collaborative Research on Plant Stress Response Through Innovations in  
Phenomics and Molecular Imaging Technologies”

***REQUEST FOR PROPOSALS:***

**The Plant Imaging Consortium Seed Funding**

Submission Deadlines:

*Proposal must be received by* **October 14, 2015, 5:00 PM**

## Program Name

The Plant Imaging Consortium Seed Funding

### Project Directors:

Arkansas EPSCoR Office  
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Arkansas Economic Development Commission  
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Little Rock, AR 72201

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## Purpose

The Plant Imaging Consortium (PIC, <http://plantimaging.cast.uark.edu/>) is an interdisciplinary network designed to enable researchers in Arkansas (AR) and Missouri (MO) to apply high-throughput phenotyping (HTP) and molecular imaging (MI) techniques to study plant responses to abiotic and biotic stresses. PIC's HTP efforts utilize a 2D HTP system at Arkansas State University (the Scanalyzer HTS), and the MI approaches supported by PIC include radioimaging techniques such as positron emission tomography (PET) as well as the use of fluorescent reporters or other non-radioactive probes. MI is uniquely suited to capture the spatial and temporal dynamics of stress responses, while HTP can compare the longer-term fitness consequences of these responses in numerous genotypes. Together these bioimaging technologies have transformative power to identify genetic sources of stress tolerance. PIC interlinks essential facilities for HTP and MI that are located throughout the two states; it brings together the necessary expertise in phenomics, computational biology, plant biology, radiochemistry and radioimaging; and it supports collaborative research to develop and optimize the protocols, probes, and other tools needed to apply MI and HTP to study a diversity of plant stress responses.

The PIC Seed Grants Program invites scientists throughout Arkansas and Missouri to: a) utilize PIC's bioimaging infrastructure to study a wide variety of stress responses in multiple plant species; and b) collaborate with PIC experts to develop improved experimental and computational approaches for applying HTP and MI in plant stress biology. For a list of PIC infrastructure, see page 2; for PIC expertise clusters, see <http://plantimaging.cast.uark.edu/>. Awards will range from \$20,000-\$50,000 over a 2-year period, and can be used to cover the costs of

travel, training, equipment usage fees, consumables, and/or software licenses to support remote data analysis. To promote workforce development, applications would be accepted from postdoctoral associates, as well as from faculty or other lead scientists. **Preference will be given to proposals that involve student participation and collaboration between the two states, and to institutional and demographic diversity among the awardees.**

### **PIC Major Instrumentation and Facilities**

<http://plantimaging.cast.uark.edu/index.php/home/infrastructure>

- Facilities for high throughput phenotyping
  - Scanalyzer HTS System for High Throughput Plant Phenotyping, Arkansas State University, Jonesboro
    - contact person: Dr. Argelia Lorence ([alorence@astate.edu](mailto:alorence@astate.edu) )
    - <http://amuidb.org/web/#!/database&table=ASU&equipment=55>
- Facilities for Radionuclide Synthesis and Imaging
  - Plant Positron Emission Tomography (PET) imager, Washington University, St. Louis
    - contact person: Dr. Yuan Chuan Tai ([taiy@mir.wustl.edu](mailto:taiy@mir.wustl.edu) ),
    - <https://www.mir.wustl.edu/research/research-laboratories/radiological-chemistry-and-imaging-laboratory-rcil/resources>
  - Missouri Research Reactor, University of Missouri, Columbia
    - contact people: Dr. Silvia Jurisson ([JurissonS@missouri.edu](mailto:JurissonS@missouri.edu) ) and Dr. Susan Lever ([levers@missouri.edu](mailto:levers@missouri.edu) )
    - <http://www.murr.missouri.edu/>
- Facilities for Non-radioactive molecular imaging:
  - Biotek Multi-mode Cell Imaging System, University of Arkansas, Fayetteville
    - contact person: Dr. Fiona Goggin ([fgoggin@uark.edu](mailto:fgoggin@uark.edu))
    - <http://amuidb.org/web/#!/database&table=UA&equipment=134>
  - Confocal Microscope, University of Arkansas, Fayetteville
    - contact person: Dr. Fiona Goggin ([fgoggin@uark.edu](mailto:fgoggin@uark.edu) )
    - <http://amuidb.org/web/#!/database&table=UA&equipment=59>
- Facilities for computing and informatics
  - High Performance Computing Center, University of Arkansas, Fayetteville
    - contact person: Dr. Jack Cothren ([jcothren@cast.uark.edu](mailto:jcothren@cast.uark.edu) )
    - <http://hpc.uark.edu/hpc/>
  - The Center for Spatial Technologies, University of Arkansas, Fayetteville
    - contact person: Dr. Jack Cothren ([jcothren@cast.uark.edu](mailto:jcothren@cast.uark.edu) )
    - <http://cast.uark.edu/home/research.html>

## Eligibility

Researchers at any higher education and research institutions in Arkansas and/or Missouri are eligible to apply, excluding faculty who are currently receiving PIC support.

Only projects with research in areas related to the Plant Imaging Consortium's focus on utilizing bioimaging tools to understand plant stressors are eligible for Seed Funding.

Seed Funds will be available in Year 2 of the Plant Imaging Consortium on or about November 1, 2015.

## Award Amount and Duration

The total project budget should be a maximum of \$50,000 (including indirect costs of no more than 8%) over a span of 6-24 months. The Plant Imaging Consortium anticipates distributing approximately \$100,000 in the first year of Seed Funding and another \$100,000 in the second and final year.

## Application Procedure

To be considered for Seed Funding, a PDF (prepared as described below) should be attached to a single email **Emily Haghghi (for Missouri PIs) Molly Alexander (for Arkansas PIs)** by the due date (Emails provide below). The Missouri and Arkansas EPSCoR Project Directors will notify proposers in their respective states whose projects do not meet the criteria above.

**Proposal must be received electronically by 5:00 PM on or before October 14, 2015.** Prepare the proposal in accordance with the guidelines below.

- a. Summary.
- b. Research goals and objectives that can be accomplished in the time requested.
- c. The Research Plan must be no more than 5 single-spaced pages at 12 pt Arial or Times New Roman font with one inch margins throughout. The research plan should include Specific Aims, Background and Significance, Preliminary studies (if any), and Research Design and Methods to be utilized.
- d. References cited.
- e. Institutional resources available to support completion of the project must be described.
- f. Budget using the Plant Imaging Consortium Budget Form that appears at the end of this document.

The Seed Funding budget **should**:

- Support research activities that can be accomplished in the time requested.
- Only include items that directly support the PI or Co-PIs research program.
- Be followed by a budget justification of up to 2 pages in length.
- Be followed by a 1-page timeline with milestones for completing the scope of work and expending the funds requested.

The Seed Funding budget **should NOT**:

- Exceed \$50,000 (total of direct costs plus F&A of 8%).
  - Include more than 1 month of salary for the PI or Co-PIs.
- g. The proposal should be accompanied by a statement from the Principal Investigator that explains his/her current and pending support and if there is significant overlap between the proposed Seed Funding request and any current or pending support.
- h. Signature page to include the signatures of the PI, any Co-PIs and the Office of Sponsored Programs of the PI and any Co-PIs.

## Proposal Submission

The proposal must be prepared as described in items a.-h. of the section above and be submitted as a single PDF. A signature from the PI's Sponsored Programs Office is required. Collaborative proposals from differing institutions required signatures from the Sponsored Programs Offices of all organizations participating. **Proposals not signed by sponsored programs office(s) will NOT be accepted.** The PDF should be submitted electronically as an email attachment sent by the PI's institutional research office. This email should be sent to Emily Haghighi ([haghighie@missouri.edu](mailto:haghighie@missouri.edu)) or Molly Alexander ([mmalexander@astate.edu](mailto:mmalexander@astate.edu)) by **5:00 PM October 14, 2015**.

## Review Criteria

The Plant Imaging Consortium's External Advisory Board, a panel of experts in the fields of plant biology and imaging technologies, will serve as external reviewers of all proposals. In reviewing proposals, the expert panel will use the general merit review criteria established by the National Science Board and NSF. In responding to the **Broader Impacts** criterion, reviewers will be asked to place special emphasis on the likelihood that the proposed project will contribute to the broad goals of the Plant Imaging Consortium.

Preference will be given to projects that focus on the following areas of research:

- Plant stress experiments that would use the Scanalyzer HTS system at A-State. Prospective applicants should contact A. Lorence ([alorence@astate.edu](mailto:alorence@astate.edu)) for planning purposes, to discuss costs and feasibility.
- Plant stress experiments that would use the PET Imager at Wash U. Prospective applicants should contact Y. Tai ([taiy@mir.wustl.edu](mailto:taiy@mir.wustl.edu)) for planning purposes, to discuss costs and feasibility.
- Plant stress experiments that would make use of the expertise and facilities for radiolabeling and radioimaging at U. Missouri. Prospective applicants should contact S. Jurisson ([JurissonS@missouri.edu](mailto:JurissonS@missouri.edu)) or S. Lever ([levers@missouri.edu](mailto:levers@missouri.edu)) for planning purposes, to discuss costs and feasibility.
- Projects in computing/bioinformatics to develop or improve methods for image analysis and/or data mining in the field of plant bioimaging. Methods should be applicable to data generated by one or more of imaging platforms supported by PIC (eg. PET, SPECT, or other radioimaging approaches; RGB, NIR, fluorescence images, such as those generated by the Scanalyzer HTS; or images from confocal microscopy or the [Biotek Multi-mode Cell Imaging System](#)). Prospective applicants should contact J. Cothren ([jcothre@uark.edu](mailto:jcothre@uark.edu); PIC Computing Lead), and/or any consortium members who could supply sample imaging data for analysis.

In addition to the priority areas listed above, we will also consider:

- projects that develop new imaging techniques or high throughput phenotyping protocols for plant stress biology, including new applications for imaging platforms such as PIC's Biotek multi-mode cell imaging system or confocal microscope.
- Projects in plant stress biology that compare the outcomes of high-throughput phenotyping experiments in the field versus controlled environments.

The consortium will place a high priority on projects that focus on plant species other than Arabidopsis. Collaboration with members of the consortium is also encouraged.

When evaluating proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge in the area of bioimaging; and

- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society while also contributing to the achievement of specific, desired consortium outcomes of enhanced collaboration.

### **General Conditions of the Award**

If a proposal is selected for funding, the Arkansas and Missouri EPSCoR Project Directors reserve the right to negotiate the budget and the term of the award.

During the term of the award and for five years after the end date, the Principal Investigator must inform the Arkansas and/or Missouri EPSCoR Project Directors of:

- Any proposals submitted and any awards received as a result of the award. Information provided should include the title of the proposal or award, the funding agency, the amount of the proposal or award, and its duration.
- Changes to the Principal Investigator's contact information.

Arkansas and Missouri EPSCoR must comply with NSF EPSCoR reporting requirements. Therefore, each Principal Investigator awarded Plant Imaging consortium Seed Funding will be required to submit an annual report identifying *the numbers of women and members of other underrepresented groups in STEM fields, faculty and staff positions, and as participants in the activities funded by the award*. Other required information will include demographics on all project participants, proposals submitted and funded, publications, presentations, patents, students receiving degrees, and research outcomes. Arkansas and Missouri EPSCoR will request information from award recipients with compliance expected within 30 days of the request.

Any publication resulting from the award must include the following statement of acknowledgment: *This research is based upon work supported by the National Science Foundation under **award no. 1430427**.*

The Principal Investigator or a Co-PI will be required to attend the Arkansas-Missouri "joint" EPSCoR Statewide Meeting.

## Contact Information

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|---|---|
| Missouri EPSCoR Office<br>Emily Haghighi<br>Program Administrator<br>109A Tucker Hall<br>University of Missouri<br>Columbia, MO 65211 | ASU Track-2 EPSCoR<br>Molly Alexander<br>Program Manager<br>P.O. Box 639<br>Arkansas State University<br>State University, AR 72467 |
| PH: (573) 884-1950<br>FX: (573) 882-0123  | PH: (870) 680-4344<br>FX: (870) 680-4348  |
| <a href="mailto:haghighie@missouri.edu">haghighie@missouri.edu</a>  | <a href="mailto:mmalexander@astate.edu">mmalexander@astate.edu</a>  |

**Budget Form.** Please use the Excel template at the website for budget information and save as PDF when completed for inclusion in proposal information. For proposals that involve more than one campus, a separate budget should be provided for each campus plus a cumulative budget not exceeding the maximum \$50,000 allowed for the project.



***Principal Investigator Contact Information***

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Name:

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Title:

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Department:

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Institution:

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Address:

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Telephone:

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Fax:

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Email:

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***Co-Principal Investigator Contact Information***

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Name:

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Title:

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Department:

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Institution:

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Address:

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***Co-Principal Investigator Contact Information***

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