United States

http://www.arabidopsis.org/portals/masc/countries/United_States.jsp
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North American Arabidopsis Steering Committee (NAASC)

NAASC (www.arabidopsis.org/portals/masc/countries/NAASC_Info.jsp) is composed primarily of U.S. researchers and represents Arabidopsis researchers in the U.S., Canada and Mexico. NAASC provides North American representation to MASC and serves as the main organizing and fundraising body for the International Conference on Arabidopsis Research (ICAR) when it is held in North America, such as for the 2011 meeting at the University of Wisconsin-Madison. Importantly, NAASC raises ICAR participation funds to support young scientists as well as U.S. members of under-represented groups in advanced levels of science. NAASC members also perform valuable service through membership on advisory committees and boards and as Investigators on federal grants that benefit the community.

1. Elections replace two NAASC members that rotate off the committee each year. The two newest members of NAASC, elected in spring 2011, are Jose Alonso (North Carolina State University, USA) and Nicholas Provart (University of Toronto, Canada). George Haughn and Scott Poethig conclude their four year term at the 2011 ICAR. Continuing members include Mark Estelle (UC San Diego), Jane Glazebrook (University of Minnesota), Xinnian Dong (Duke University), Blake Meyers (University of Delaware), Wolf Frommer (Carnegie Institution for Science) and Dominique Bergmann (Stanford University). The new NAASC president and representative to MASC for 2011-2012 is Mark Estelle. Jane Glazebrook will continue as NAASC Treasurer.
2. Joanna Friesner, NAASC Coordinator, supports all NAASC efforts including, among other duties, acting as lead conference organizer for North American ICARs and assisting in development of NAASC-led community initiatives such as the new IAIC (see below).
3. 2010 ICAR (Japan): Mark Estelle applied and received NSF funding to support U.S. participants including full funding for five under-represented minorities and travel awards for four early career scientists and seven invited speakers. NAASC supported travel awards for seven additional early-career scientists.
4. 2011 ICAR (U.S.): Xinnian Dong submitted a proposal to NSF requesting support for eight under-represented minorities, ten early career scientists, and several invited speakers. Blake Meyers submitted proposals to the U.S. Departments of Agriculture and Energy requesting support for additional early career scientists and several invited speakers. NSF and USDA proposals were awarded at the time of printing; DOE award decision is pending.
5. Committee service: Mark Estelle and Jane Glazebrook are co-chairs of the ICAR 2011 conference organizing committee. Scott Poethig and Blake Meyers serve on the ABRC advisory committee. All remaining NAASC members are members of the ICAR 2011 organizing committee.

The International Conference on Arabidopsis Research (ICAR) Returns to the University of Wisconsin-Madison

Madison is a site of historical significance to the Arabidopsis community. This will be the 9th time the ICAR has been held on the Madison campus out of 22 meetings spanning 47 years. The first meeting was held in Germany in 1965 and was attended by about 25 people. In comparison, ICAR 2011 is expected to have about 850 attendees. Meetings were held sporadically until 1995 when the first Madison-based ICAR occurred. At that time the community decided to hold annual meetings due to rapid advances in Arabidopsis research beginning with international cooperation to sequence the Arabidopsis genome. Meetings were then held two out of three years in Madison with each third year at an international site. It was due in large part to the significant efforts of NAASC and the generous support of U.S. funding agencies, (in particular, the National Science Foundation), that an annual ICAR has been achieved. In 2007 the Multinational Arabidopsis Steering Committee (MASC), representing the international community, decided on a new schedule that would diversify meeting effort, location and cost and facilitate participation by scientists in other regions.

The ICAR now rotates on a 3 year cycle between North America, Europe, and Asia/Pacific Rim. The 22nd ICAR, June 22-25, 2011, will once again be held at the University of Wisconsin, Madison. Conference co-chairs are Mark Estelle and Jane Glazebrook, the lead organizer is Joanna Friesner, NAASC Coordinator, and the remaining NAASC members comprise the rest of the organizing committee.

ICAR 2012 is scheduled for Vienna, Austria, and ICAR 2013 will be in Australia.

Establishing an International Arabidopsis Informatics Consortium (IAIC) in Response to Reductions in TAIR Funding

1. NAASC and MASC hosted two workshops in 2010 (UK and US locations) to consider the future bioinformatics needs of the Arabidopsis community as well as other science communities that depend vitally on Arabidopsis resources. The workshops also discussed potential solutions to funding bioinformatics storage and management. The impetus for the workshops was an immediate threat to funding of TAIR, the central Arabidopsis information point which has been a vital resource

to the Arabidopsis community through its maintenance of the Arabidopsis genome sequence, service as a portal for stock orders from ABRC from the US (and other countries), and other valuable organizing and services and resources. The workshops addressed topics including: the data types generated and used by the Arabidopsis community, the future needs of the community, and the technological, financial, and organizational sustainability of a major Arabidopsis bioinformatics resource.

Major Outcomes of the Workshops:

- Publication: IAIC Contributors. An international bioinformatics infrastructure to underpin the Arabidopsis community. Plant Cell 2010 22(8):2530-6 (http://www.ncbi.nlm.nih.gov/pubmed/20807877).
- Proposal to develop a new International Arabidopsis Informatics Consortium (IAIC).
- A presentation of the workshops, the report, and the findings was given during the 2010 ICAR in Yokohoma, Japan. Community feedback and discussion were solicited.
- Establishment of a preliminary IAIC website (http://arabidopsis.org/portals/masc/IAIC.jsp).
- Initial IAIC public workshop held at the Plant and Animal Genome (PAG) meeting in January, 2011.

2. NAASC member Blake Meyers (University of Delaware) took the lead on implementing the recommendation to establish an International Arabidopsis Informatics Consortium (IAIC). With assistance from Co-PI Erich Grotewold (ABRC and Ohio State University) and Joanna Friesner (NAASC Coordinator), Meyers submitted a funding proposal to the National Science Foundation's Research Coordination Network (RCN) funding opportunity. Additional Co-PIs include Doreen Ware (CSHL), Jim Carrington (Oregon State University) and Volker Brendel (Iowa State University) while additional senior personnel include Nick Provart (University of Toronto), Jim Beynon (Warwick University), Ruth Bastow (GARNet), Sonya Lowry (iPlant), and Dan Stanzione (University of Texas-Austin.) Support is intended to foster new collaborations, including across international boundaries, and encourage collaborative technologies and development of community data and meta-data standards, among other goals. The proposed IAIC would be built around a distributed model to enable flexible funding approaches to be used on an international scale. The IAIC is proposed to consist of several components:
   - The Arabidopsis Informatics Portal (AIP) that links geographically distributed resources and combines their outputs into a user-friendly interface. The AIP would be the operational center of the IAIC and personnel associated with the AIP would provide training for researchers wishing to access data and for data and resource providers wishing to interact with the IAIC.
   - Gold standard genome annotation
   - Genome/sequence curation
   - Stock and resources database(s) to enable rapid access to resources
   - Additional specific modules could be added to the above components based on funding and data availability in respective countries; e.g. comparative genomics which could involve Arabidopsis, Brassicacea, crop genomes, other species, etc.
3. Current IAIC Proposal Status: IAIC RCN funding is pending an NSF review of a revised management plan. In response to reviews that the initial steering committee lacked expertise in cyberinfrastructure and interoperability, Meyers facilitated inclusion of two members of the NSF-funded iPlant Collaborative to join the group of investigators. Dan Stanzione, a participant in both planning workshops, provides expertise in cyberinfrastructure and high-performance computing. Sonya Lowry has expertise in data management and organizational structures and how software organization impacts its architecture. They also will serve as valuable liaisons to other cyberinfrastructure researchers in the US and abroad and help to draw in the expertise provided by developers working in industry, commerce and government.
4. Next steps: Nominations to the IAIC Scientific Advisory Board (SAB) and elections are expected to begin this summer, following community discussion at the 2011 ICAR.

Conclusion of the AT2010 Project- What's next for Arabidopsis funding in the U.S.?

For the last decade, large projects in Arabidopsis genomics have been funded primarily through the NSF 2010 program. These projects were funded and managed through the core programs. The last applications for the 2010 program were funded this year. Parag Chitnis indicated that although NSF no longer has a dedicated program for receiving proposals in Arabidopsis genomics, NSF will continue to support large-scale research projects on Arabidopsis. Such grant applications should be submitted directly to appropriate NSF programs, by the deadlines for the program.

Jane Silverthorne gave a presentation at the first public meeting of the newly established IAIC (see description in the previous section) at PAG 2011 this past January. She outlined a number of relevant NSF programs that will accept proposals using Arabidopsis. U.S. researchers can read about NSF programs and their (current) deadlines by accessing the PowerPoint presentation located at the IAIC website: http://arabidopsis.org/portals/masc/IAIC.jsp

Notable Awards and Honors for U.S. Researchers Using Arabidopsis

- Presidential Outstanding Career Award 2010: Dominique Bergmann
- Election to the American Association for the Advancement of Science (AAAS) 2010- Eduardo Blumwald, Roger Hangarter, Paul Hasegawa, Roger Innes, Hong Ma, Rob McClung, Katherine Osteryoung, Heven Sze, Michael Thomashow.
- The Genetics Society of America (GSA) George W. Beadle Award for outstanding contributions to the community of genetics research- 2011: Joe Ecker.
- Awarded by the American Society of Plant Biologists (ASPB): 2010 Stephen Hales Prize: Sakis Theologis; 2010 Charles Albert Shull Award: Dominique Bergmann; 2010 Early Career Award: R. Keith Slotkin; 2010 Lawrence Bogorad Award for Excellence in Plant Biology: Nam Hai-Chua; Fellow of ASPB- 2010: Julia Bailey-Serres, Alice Cheung, Gloria Coruzzi, A.S.N. Reddy, Stan Roux, Gary Stacey, and Elliot Meyerowitz. Award Descriptions: http://my.aspb.org/?AF_Awards.

Several Notable Research Breakthroughs Involving U.S. Researchers

Several research advances deserve special mention. Genome wide association (GWA) has become popular approach in human genetics because it takes advantage of the genetic and phenotypic variation present in existing populations. To test the value of GWA for determining the genetic basis of natural phenotypic variation in Arabidopsis, Nordborg and colleagues (1) examined 107 phenotypes in a collection of 196 ecotypes genotyped for 250,000 SNPs. Although population substructure complicated the analysis, it was nevertheless possible to identify reasonable candidate genes for many of these traits. This study suggests that GWA will be of considerable value in ecological and evolutionary genetic studies of Arabidopsis.

Methods for producing doubled haploid lines (i.e., instant inbred lines) have important practical applications. In maize, it has long been possible to produce these lines using stocks that generate maternal or paternal haploid seedlings. This method has now been extended to Arabidopsis with the discovery that a mutant form of the centromere-specific protein, CENH3, induces chromosome elimination (2). These investigators produced uniparental haploid plants by crossing transgenic cenh3 mutants expressing this aberrant form of CENH3 with wild type plants; spontaneous diploidization produced doubled haploids. Now that the molecular basis of chromosome elimination is understood, it should be possible to extend this method to other species.

Finally, we would like to draw attention to a new, broadly applicable method for studying gene expression and chromatin structure in specific cells and tissues (3). In this approach (called INTACT), nuclei are tagged with biotin by co-expressing a nuclear envelope-associated protein containing a biotin ligase recognition domain, along with E. coli biotin ligase. Nuclei from specific cells or tissues are labeled by expressing the nuclear envelope protein from a cell-type-specific promoter (in combination with a ubiquitously expressed biotin ligase), and are then isolated using strepvidin-coated beads. RNA and chromatin purified from these isolated nuclei is highly specific, and can be used for a wide range of studies.

1. Atwell, S Huang, YS Vilhjalmsson, BJ Willems, G Horton, M Li, Y Meng, D Platt, A Tarone, AM Hu, TT *et al*. (2010) Genome-wide association study of 107 phenotypes in *Arabidopsis thaliana* inbred lines. Nature (465): 627-631.
2. Ravi, M and Chan, SW (2010) Haploid plants produced by centromere-mediated genome elimination. Nature (464): 615-618.
3. Deal, RB and Henikoff, S (2010) A simple method for gene expression and chromatin profiling of individual cell types within a tissue. Dev Cell (18): 1030-1040.