**Susan Mc Kinney**

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:24 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: out of office Re: Update from University of Minnesota

---------- Forwarded message ----------
From: **Hannes Dempewolf** <hannes.dempewolf@croptrust.org>
Date: Fri, May 29, 2015 at 1:54 PM
Subject: out of office Re: Update from University of Minnesota
To: brade005@umn.edu

I am currently out of the office. I will return to the office on 24 June 2015. For urgent matters regarding the Crop Wild Relatives Project, please contact Ms. Beri Bonglim (cropwildrelatives@croptrust.org).

Thanks,
Hannes

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Hannes Dempewolf
Scientist and Project Manager
Global Crop Diversity Trust
Platz der Vereinten Nationen 7
53113 Bonn, Germany
Office: +49 228 85427 115
Mobile: +49 171 1839227
www.croptrust.org

*Securing our Food, Forever*

--
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jbradeen@umn.edu
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http://sbc.umn.edu

**Connect with Plant Pathology:**

## Susan Mc Kinney

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:24 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: CWR efforts at University of Minnesota Stakman-Borlaug Center

---------- Forwarded message ----------
From: **Peter Wenzl** <peter.wenzl@croptrust.org>
Date: Thu, Jan 22, 2015 at 5:37 AM
Subject: Re: CWR efforts at University of Minnesota Stakman-Borlaug Center
To: James Bradeen <brade005@umn.edu>
Cc: Brian Steffenson <bsteffen@umn.edu>, "hokan018@umn.edu" <hokan018@umn.edu>, ppardey@umn.edu

Dear Jim,

It was a pleasure meeting you again in San Diego! Many thanks for your follow-up message and apologies for my delayed response - settling in Bonn is taking us some time..

It sounds like as if UMN could really become an important player in DivSeek and -vice versa- DivSeek could perhaps help you promoting the importance of mining genetic resources within UMN. You're probably aware that UMN has already signed up for DivSeek through Gary Muehlbauer.

Your link to InSTePP is intriguing - bringing together genomics and economics could help the DivSeek community as a whole to better justify and sell DivSeek-like projects to decision makers, I believe. It would be interesting to learn a bit more about your internally funded 1-year project you've mentioned. Btw, Phil and I had an e-mail exchange about InSTePP and DivSeek late last year; we said we'd link up again once I had moved to the Trust, so I'm copying him here.

As I believe you're aware, Susan McCouch has been elected as Chair of the DivSeek Steering Committee, but we still need to elect other Steering Committee members. Once the Steering Committee is in place, there'll be more clarity on the initial areas that DivSeek will be focusing on, and it would be good for you, Phil and myself to link up to explore opportunities of working together. I'll keep you posted...

In the meantime, please let me know in case some of the DivSeek material could help strengthening your CWR case within UMN.

Best, Peter

On Sat, Jan 10, 2015 at 11:53 PM, James Bradeen <brade005@umn.edu> wrote:
Hi Peter:

Great to see you again. Congrats on the new position and good luck with the move!

I'm really excited about the work you are doing and the DivSeek initiative. This aligns so well with our views and I hope there are opportunities to coordinate. I've already mentioned your talk to our Dean, indicating that I will fill him in a bit more soon.

As I mentioned, I am both Head of the Department of Plant Pathology at the University of Minnesota and co-director of the new Stakman-Borlaug Center (SBC) for Sustainable Plant Health. The SBC serves as an umbrella bringing together scientists and social scientists to solve complex plant health problems that impact food security and ecosystem health through coordinated research and capacity building. We define 'plant health' broadly recognizing that plant vitality is impacted by both biotic (pathogens, insects) and abiotic (soil nutrition, water availability, heat/cold, etc.) factors.

We believe that crop wild relatives are an indispensable resource for meeting food challenges in a manner that protects natural resources today and in the future. Our university encompasses approximately 160 PI-level plant scientists and many of us already use crop wild relative in our research and breeding. But our efforts in this arena have been isolated...one research project focused on one gene and one population at a time. At the same time, our University encompasses excellent genomics and informatics resources.

Right now, the SBC is working with InSTePP (International Science Technology Policy and Practice Center led by Phil Pardey) to develop an integrated biology/economics platform to actively and proactively respond to emerging threats to food security on a global scale. We are nearing the end of a one year, internally funded pilot project and one of the initiatives emerging is the use of genomics/high throughput phenotyping/informatics/data visualization to effectively mine genebank collections of CRWs for genes useful to crop improvement. We are especially focused on wheat, barley, potato, soybean, apple, and grape. I need to be clear that we are just at the beginning of this effort...it isn't funded, but we hope to organize researchers and secure large scale funding moving forward.

Your efforts and the DivSeek initiative could be very helpful to me in convincing our Dean and our VP for Research of the importance of CRWs. I also believe UMN and the SBC can be excellent allies in your efforts and I'd love to explore this more fully.

Please share our thoughts. Many thanks!

--Jim

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--

Peter Wenzl
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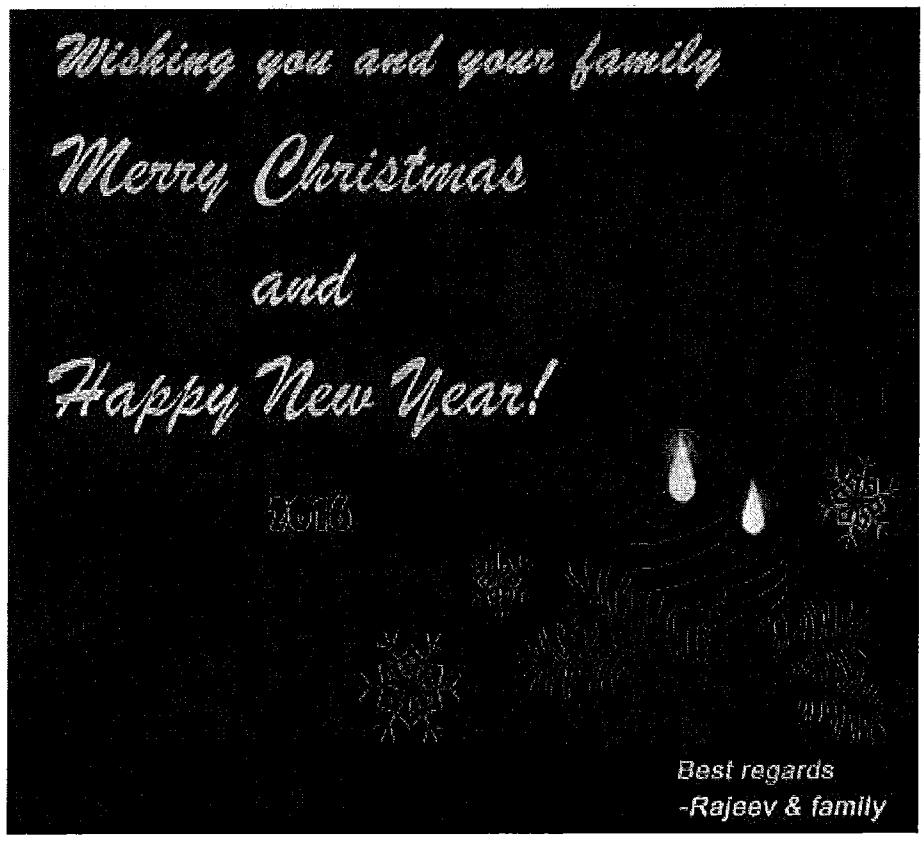
## Susan Mc Kinney

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:22 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: Merry Christmas and Happy New Year- 2016
**Attachments:** Flyer_Final.pdf

---------- Forwarded message ----------
From: **Varshney, Rajeev (ICRISAT-IN)** <R.K.Varshney@cgiar.org>
Date: Thu, Dec 17, 2015 at 11:48 PM
Subject: Merry Christmas and Happy New Year- 2016
To: "Varshney, Rajeev (ICRISAT-IN)" <R.K.Varshney@cgiar.org>




PS: We are also pleased to announce that InterDrought-V (ID-V) will be held during Feb 21-25, 2017 at Hyderabad. Please visit http://ceg.icrisat.org/idV/home.html and mark your calendar for these dates to participate in ID-V. Thanks!

**********
**Rajeev K. Varshney**, *PhD, FNA, FCSSA, FNAAS, FNASc*
**Research Program Director,** Grain Legumes &
**Director**, Center of Excellence in Genomics (CEG)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
*and*
**Winthrop Research Professor**, School of Plant Biology & Institute of Agriculture
The University of Western Australia

*Mailing address:*
Bldg # 300, Center of Excellence in Genomics (CEG)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Patancheru - 502 324, Greater Hyderabad, INDIA

Tel: 0091 40 30713305; Fax: 0091 40 3071 3074/ 3075
**********

"A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty." ~Winston Churchill

Many thanks and kind regards

Rajeev

--

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jbradeen@umn.edu
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**Connect with Plant Pathology:**

# InterDrought-V

**Hyderabad International Convention Center (HICC)**
**Hyderabad, India**
**21-25 February, 2017**

## Conference Topics:

- ❖ Setting the biophysical context
- ❖ Maximising dryland crop production
- ❖ Plant productivity under drought
  - *Effective capture of water*
  - Transpiration efficiency
  - *Vegetative Growth*
  - Reproductive development, yield, yield quality
- ❖ Breeding for water-limited environments
- ❖ Agronomic management for water-limited environments

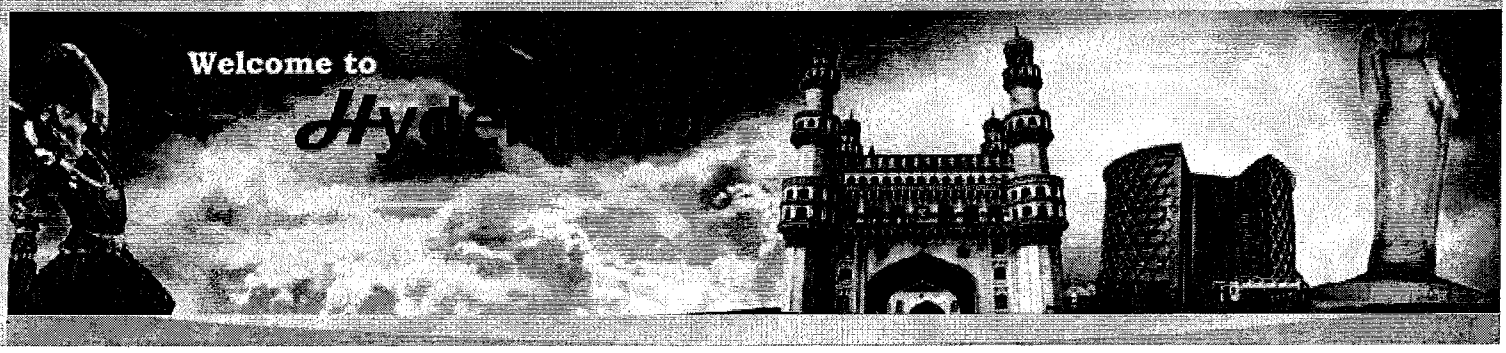

Contact: r.k.varshney@cgiar.org
id5.icrisat@gmail.com

Website: www.ceg.icrisat.org/idV

InterDrought Chair:
*Francois Tardieu, INRA, France*

InterDrought Vice-Chair:
*J S Sandhu, ICAR, India*

Conference Organization Chair:
*Rajeev Varshney, ICRISAT, India*

## Susan Mc Kinney

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:22 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: NGGIBCI Meeting, ICRISAT, Hyderabad (Feb 18-20, 2014)
**Attachments:** NGGIBCI Flyer _21Oct 2014.pdf

---------- Forwarded message ----------
From: **Varshney, Rajeev (ICRISAT-IN)** <R.K.Varshney@cgiar.org>
Date: Fri, Oct 24, 2014 at 5:08 AM
Subject: NGGIBCI Meeting, ICRISAT, Hyderabad (Feb 18-20, 2014)
To: "Rajeev Varshney (ICRISAT/GCP)" <varshney.raj@googlemail.com>

Dear All,

Greetings from ICRISAT!

I am pleased to share that in continuation of earlier meetings, we will be organizing the 5th International Conference on Next Generation Genomics and Integrated Breeding (NGGIBCI-2015) for Crop Improvement at ICRISAT Campus, Greater Hyderabad, India during Feb 18-20. 2014. We are pleased to share that we have assembled a panel of very eminent scientists to speak/chair sessions in the meeting. Details of the meeting are available at the website www.vnggibci.icrisat.org and in the attached flyer.

We invite you to participate in the above mentioned meeting as well as request you to circulate flyer to your colleagues and collaborators.

Many thanks and kind regards

Rajeev

**********
**Rajeev K. Varshney**, *PhD, FNAAS, FNA*
**Research Program Director,** Grain Legumes &
**Director,** Center of Excellence in Genomics (CEG)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
*and*
**Winthrop Research Professor**, School of Plant Biology & Institute of Agriculture
The University of Western Australia

*Mailing address:*
Bldg # 300, Center of Excellence in Genomics (CEG)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Patancheru - 502 324, Greater Hyderabad, INDIA

Tel: 0091 40 30713305; Fax: 0091 40 3071 3074/ 3075
**********

--
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http://sbc.umn.edu

**Connect with Plant Pathology:**

# 5th International Conference on Next Generation Genomics and Integrated Breeding for Crop Improvement

V NGGIBCI

ICRISAT, Hyderabad, India

February 18 - 20, 2015

ICRISAT
Science with a human face

## Key Speakers/ Participants

**Gary Atlin,** Bill & Melinda Gates Foundation, USA
**Hélène Berges',** *CNRGV - INRA, France*
**Doug Cook,** *University of California-Davis, USA*
**Jose Crossa,** *CIMMYT, Mexico*
**Swapan K Datta,** *Indian Council of Agricultural Research, India*
**Hannes Dempewolf,** *Global Crop Diversity Trust, Germany*
**Dave Edwards,** *University of Queensland, Australia*
**Jeffrey Ehlers,** *Bill & Melinda Gates Foundation, USA*
**Andreas Graner,** *IPK-Gatersleben, Germany*
*Hari S Gupta, *Borlaug Institute for South Asia, India*
**Pushpendra K Gupta,** *CCS University, India*
**Robert Henry,** *University of Queensland, Australia*
**Emma Huang,** *CSIRO, Australia*
**John Hickey,** *University of Edinburgh, UK*
**Scott Jackson,** *University of Georgia, USA*
**Suk-Ha Lee,** *Seol National University, Korea*
*Hei Leung, *IRRI, The Philippines*
**David Marshall,** *The James Hutton Institute, UK*
*Greg May, *DuPont Pioneer, USA*
*Kenneth McNally, *IRRI, The Philippines*
**Trilochan Mohapatra,** *Central Rice Research Institute, India*
**Henry T. Nguyen,** *University of Missouri, USA*
**Frank Ordon,** *Julius Kühn-Institut, IRRST, Germany*
**Deepak Pental,** *University of Delhi, India*
*Jesse Poland, *Kansas State University, USA*
**BM Prasanna,** *CIMMYT-Nairobi, Kenya*
**Jean-Marcel Ribaut,** *Generation Challenge Programme, Mexico*
**Steve Rounsley,** *DowAgro, USA*
**Patrick Schnable,** *Iowa State University, USA*
**Howard Yana-Shapiro,** *MARS Inc, USA*
**Andrew Sharpe,** *National Research Council of Canada, Canada*
**E A Siddiq,** *Institute of Biotechnology, ANGRAU, India*
*Ashok K Singh, *Indian Agricultural Research Institute, India*
*Nagendra K Singh, *NRCPB, India*
**David Somers,** *Monsanto, USA*
**Mark E Sorells,** *Cornell University, USA*
**German C Spangenberg,** *Dept. of Environ. and Pri. Ind., Australia*
**Nils Stein,** *IPK-Gatersleben, Germany*
**Tim Sutton,** *ACPFG, University of Adelaide, Australia*
**Peter Wenzl,** *CIMMYT, Mexico*
**Gengyun Zhang,** *BGI, China*
*.....more speakers to be joined soon*

*yet to be confirmed

## Conference Themes

- Next generation genomics
- Novel mapping approaches and QTLs
- Advances in phenotyping and trait mapping
- Marker-assisted selection / backcrossing
- Genomic selection
- Decision support tools for breeding
- New horizons for crop improvement

## Welcome!

Better communication and sharing of the ideas among scientists and stakeholders are critical to achieve the goal of global food security. This conference will provide a platform for scientists to interact with each other, present their work and discuss different aspects of modern genomics and breeding for crop improvement.

The conference will be organized under well-structured technical sessions that will include invited lectures by eminent speakers in the fields of genetics, genomics, breeding and allied sciences. A poster session will also be arranged to encourage participation of young researchers in the conference.

You, your colleagues and collaborators are invited to contribute to the scientifically rich meeting and explore the historical city of India in a pleasant weather!!

## Registration*

| | Regular | Student |
|---|---|---|
| **Early Bird (before Dec 15, 2014)** | | |
| Indian National | INR 12,000 | INR 8,000 |
| Foreign National | US$ 400 | US$ 300 |
| **Late (before Jan 15, 2015)** | | |
| Indian National | INR 14,000 | INR 10,000 |
| Foreign National | US$ 500 | US$ 400 |

*The conference will accept only 150 registered participants. Industry participants need to contact Organizers.

## Accommodation

Special negotiations are being made with a range of budget hotels in the vicinity of ICRISAT. Details about booking accommodation will be available on the website starting from November 1, 2014 (www.vnggibci.icrisat.org).

## Conference Organizer

**Rajeev K Varshney**
**Center of Excellence in Genomics (CEG)**
**ICRISAT**
**Hyderabad-502324**
**India**
**Tel:** +91 40 30713305, +91 40 30713387
**Email: nggib2015@gmail.com**
**Web: www.vnggibci.icrisat.org**

**Susan Mc Kinney**

| | |
|---|---|
| **From:** | James Bradeen |
| **Sent:** | Monday, December 28, 2015 11:21 AM |
| **To:** | Susan Mc Kinney |
| **Subject:** | Fwd: Report on the technical part of DivSeek meeting in San Diego |
| **Attachments:** | DivSeek technical meeting - Annexes.pdf; DivSeek technical meeting - Summary.pdf |

---------- Forwarded message ----------
From: **Peter Wenzl** <peter.wenzl@divseek.org>
Date: Tue, Feb 24, 2015 at 6:59 AM
Subject: Report on the technical part of DivSeek meeting in San Diego
To: info@divseek.org
Cc: Susan McCouch <srm4@cornell.edu>, Ruth Bastow <ruth.bastow@divseek.org>, Daniele Manzella <daniele.manzella@divseek.org>, "Powell, Wayne (CGIAR Consortium)" <w.powell@cgiar.org>

Dear DivSeek colleagues,

Please find attached a report on the technical part of the DivSeek meeting in San Diego this January.

The first part of the report includes a brief summary and a side-by-side comparison of the projects and platforms presented by the speakers, to identify potential commonalities and complementarities among ongoing efforts.

The presentations themselves can be downloaded as a zip file
here: https://www.dropbox.com/s/vubswuoqor0hddk/Presentations.zip?dl=0

The second part of the report analyses the detailed written feedback we received from you via the questionnaire that was distributed during the meeting.

Your guidance in the form of previous surveys and the feedback to this questionnaire will provide a basis upon which the incoming *Steering Committee*, with support from the *Joint Facilitation Unit*, will develop an initial program of work for DivSeek.

You will receive an invitation to elect *Steering Committee* members within the next several days.

Best wishes,

Peter
(on behalf of the *Joint Facilitation Unit*)

--
Peter Wenzl
DivSeek Liaison
Global Crop Diversity Trust
Platz der Vereinten Nationen 7

53113 Bonn, Germany
Office: +49 228 85427 126
Mobile: +49 171 1832240
www.croptrust.org

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# Annex A:

## Summary of presentations given at the DivSeek meeting in San Diego (9 Jan 2015)

### Table 1: *Crop-focused germplasm-characterization efforts*

| | Kevin Pixley (CIMMYT) | Ruaraidh Sackville Hamilton (IRRI) | Nils Stein (IPK) | Rajeev Varshney (ICRISAT) | Theo van Hintum (CGN) | Wayne Powell (CGIAR CO) |
|---|---|---|---|---|---|---|
| **Name of project or program** | Seeds of Discovery (SeeD) | International Rice Improvement Consortium (IRIC) | Biodiversity Informatics to Close the Gap from Gene Information to Educated Utilization of Diversity Stored in Genebanks (BRIDGE) | Multiple projects for different crops | National genebank example | CGIAR Consortium Office |
| **Crop(s)** | Maize, wheat | Rice | Barley | Sorghum, chickpea, pigeon pea, groundnut, pearl millet | - | Rice, banana, plantain, beans, cassava, tropical forages, maize, wheat, potato, sweet potato, Andean roots & tubers, grain legumes, barley, forage & range crops, trees, dryland cereals, grain cereals, cowpea, cassava, yam |
| **Type of effort** | Research project | Consortium | Research project | Several research projects | Genebank operations | Consortium of research centers |
| **Objectives** | Identify & mobilize useful diversity in maize & wheat genebanks | Provide information and tools to accelerate rice breeding by exploring & harnessing rice diversity | Flagship project for DivSeek & blueprint for IPK genebank to facilitate informed utilization of genetic resources and improve conservation management; follows outline of SeeD project | To develop genomic resources for ICRISAT's "orphan" crops and characterize their genetic resources | - | - |
| **Main areas of activity** | [1] "Core" activities (genotyping, databases, IP strategy); [2] "associated" activities building upon core activities (specific traits and geographic areas) | [1] Organize genotypic, phenotypic, expression and other data into information system for global rice research community; [2] Provide user-friendly access to data through a single portal | [1] Catalogue diversity; [2] upload new and legacy data, in standardized formats, to data warehouses for dissemination via intuitive user interfaces; [3] address population-genetics and domestication-related scientific questions | [1] Develop genomic resources; [2] characterize genetic diversity; [3] phenotype traits targeted by breeders; [4] perform GWAS | - | - |

| | Kevin Pixley (CIMMYT) | Ruaraidh Sackville Hamilton (IRRI) | Nils Stein (IPK) | Rajeev Varshney (ICRISAT) | Theo van Hintum (CGN) | Wayne Powell (CGIAR CO) |
|---|---|---|---|---|---|---|
| **Progress & highlights** | Genetic analysis of almost entire maize and 1/3 of the wheat collections at CIMMYT completed; ICARDA's wheat collection to be genotyped in 2015; millions of phenotypic measurements; implementing Germinate as a data repository; developing 'bridging germplasm' half way between genebanks and breeding programs; capacity-building underway | 4,500 available lines available through genebank; whole-genome re-sequencing data for approx. 3,000 purified lines; characterization data from genebank; not much other phenotypic data yet (no large-scale phenotypic evaluation data); some expression data | To initiate in May 2015 | Example for chickpea: 300 accessions whole-genome resequenced -> identified 4.7M SNP; established field-based, high-throughput phenotyping systems including for root traits; identified marker-trait associations for yield, etc.; now whole-genome resequencing of 3,000 accessions | - | - |
| **Challenges encountered** | 55 funding reduction in 2013; SMTA is obstacle for engaging with private partners; some partners hesitant to contribute their genebank materials to project | No funding for initiative; how to structure PPP; currently no issues with SMTA, but this may change in the context of hybrid rice; inadequate genomic references (data quality become a function of the genetic distance from single reference genome); resources for big-data platforms | Funding for phenotyping | Data storage; germplasm sharing | Managing large numbers of accessions; underfunded; genebanks lack knowledge of genomics and bioinformatics; one-way flow out of genebanks into research community without information flowing back and adding value to genebanks and most derived materials getting lost | - |
| **Subsetting of accessions** | Genetic characterization: all accessions (27,000 maize, 120,000 wheat); phenotypic characterization: subsets of varying size | Genetic characterization: subset of 3,000 accessions | Genetic characterization: all accessions (20,000) | Genetic characterization: Core collections (10) and min-core collections (0.4) derived from a total of 110,000 accessions of five species; reference sets of 300 accessions/crop defined based on SSR using the "composite" collection approach (GCP); starting with subsets and moving towards systematic genetic characterization | - | - |
| **Sample preparation for genetic analyses** | Pool of 30 seeds/accession (maize); single seed/accession (wheat) | Purified lines derived through SSD from genebank accessions | Still under debate; pool of 50 seeds per accession or single seed/accession | - | - | - |

| | Kevin Pixley (CIMMYT) | Ruaraidh Sackville Hamilton (IRRI) | Nils Stein (IPK) | Rajeev Varshney (ICRISAT) | Theo van Hintum (CGN) | Wayne Powell (CGIAR CO) |
|---|---|---|---|---|---|---|
| **Type of genetic data generated** | Genotyping by sequencing (DArTseq & Cornell platforms) | Whole-genome resequencing with 10 million SNP; SNP-chip data (700K and 44K) | Genotyping by sequencing; whole-genome shotgun sequencing on selected accessions | Genetic characterization: create reference genome sequences alone or in collaboration (pigeon pea, chickpea, groundnut, peanut); whole-genome resequencing of subsets (e.g., chickpea); genotyping by sequencing (Cornell platform) | - | - |
| **Type of phenotypic data generated** | Large-scale field trials to evaluate heat/drought tolerance, disease resistances, and grain-quality traits | Limited phenotypic data to this date; gene-expression data | Make existing legacy data available; possibly phenotype selected accessions | Field trials in African and Indian locations; drought tolerance (incl. root traits); application of field-based, high-throughput techniques | - | - |
| **Population development?** | "Bridging germplasm" | no | no | - | - | yes; boundaries between pre-breeding and breeding are increasingly blurred |
| **Access to germplasm** | SMTA for exchanging germplasm accessions | SMTA for exchanging germplasm accessions; question: are SSD-derived lines "germplasm under development"? | - | - | - | SMTA for exchanging accessions |
| **Controlled vocabulary and ontologies used?** | - | - | Plans to implement community standards | - | - | - |
| **Type of information systems used** | Germinate as data repository; working with, and testing databases of IBP and DArT for suitability for managing primary data | Oracle database as data repository; Galaxy workbench for analyzing genetic data; discussions with iPlant and National University of Singapore to identify other already existing resources | Link to IPK genebank information system; will create data warehouse by building on existing solution where possible | Currently in-house; now talking to iPlant | - | Various |

| | Kevin Pixley (CIMMYT) | Ruaraidh Sackville Hamilton (IRRI) | Nils Stein (IPK) | Rajeev Varshney (ICRISAT) | Theo van Hintum (CGN) | Wayne Powell (CGIAR CO) |
|---|---|---|---|---|---|---|
| **Governance & data-sharing** | CGIAR/CIMMYT open-data access policies; project partners get 2-year period of initial, preferential access to data for publishing; PPP to access know-how & tools | Consortium; contributing partners get early, preferential access to data and tools under development by others (= incentive); others get early access to contributing partners' data and tools (= disincentive to make everything immediately publicly available); most public partners to contribute phenotypic data; private partners have to contribute funds; compliant with CGIAR Intellectual Assets Principles as much as possible; all released data linked to purified lines (available through genebank) and will eventually be made publically available | Sharing of genomic data as soon as possible and without strings attached | Data (allele calls) available as global public goods | | CGIAR Intellectual Assets Principles |
| **How could DivSeek add value to project/program?** | Forum for discussing & sharing experiences, approaches, methods; advocating best practices for data management; assure interoperability between projects; facilitate access to informatics tools; options to host big data sets; contribute to create pre-competitive domain | IRIC = DivSeek for rice (a "tooth in the DivSeek comb"); chance to secure funding for a "mega project" to mine genetic resources; | Platform to link with other projects to adapt already proven solutions particularly for information management | Data analysis, storage & hosting; assist with germplasm sharing issues | Ensure that genebank managers and genomics specialists work together to design studies and select materials; ensure that genomics data are linked back to accessions and add value to genebank collections to better serve all types of future users; convincing use cases and pilot projects; intuitive interfaces to genomics data; capacity building; | Genebanks are part of the CGIAR's core business and should be involved in DivSeek to get them to the next level |

| | Kevin Pixley (CIMMYT) | Ruaraidh Sackville Hamilton (IRRI) | Nils Stein (IPK) | Rajeev Varshney (ICRISAT) | Theo van Hintum (CGN) | Wayne Powell (CGIAR CO) |
|---|---|---|---|---|---|---|
| **How could project/program contribute to DivSeek?** | Sharing experience with inbred and outcrossing crop in terms of genotypic analyses, data storage; vision on how to ensure equity (through capacity building and other means) | Rice = "Arabidopsis with meaning": model for deploying genomic data in DivSeek projects: what's going to be possible for other crops, can be done now in rice -> learning to benefit other DivSeek projects | Can contribute to DivSeek through IPK's experience with genebank information management systems, bioinformatics and population genomics | - | Provision of genomics-ready materials (SSD and research populations derived from accessions; etc.) | The CGIAR genebanks are the backbone of the international genebank system and hence would provide a substantial portion of the accessions to be characterized; DivSeek could be part of the call for new CGIAR Research Programs (CRP) |

## Table 2: *Information management-related efforts*

| | Laurel Cooper (OSU) | David Marshall (JHI) | Matthew Vaughn (TACC) | Susan McCouch (Univ. Cornell) | Paul Kersey (EMBL-EBI) |
|---|---|---|---|---|---|
| **Name of project or program** | Planteome: Common Reference Ontologies and Applications for Plant Biology (www.planteome.org) | Germinate | iPlant | Genomic and Open-source Breeding Informatics Initiative (GOBII) | ELIXIR |
| **Crop(s)** | Most data currently is from maize, Arabidopsis and rice, along with 20 other species; expanding towards all green plant species, particularly crops | Barley, maize, wheat, potato | Any | Rice, maize, wheat, sorghum, chickpea | - |
| **Type of effort** | International collaboration to develop centralized platform | Ongoing user-driven software-development effort | 10-year software-development project | Software-development project | Provider of bioinformatics services and databases for life sciences |
| **Objectives** | Provide centralized platform for plant ontologies, annotated molecular datasets, and visualization & analysis tools for integration in online plant resources; co-develop metadata standards | Provide a multi-crop data repository/warehouse for genotypic, phenotypic, pedigree & climatic data to characterize germplasm | Design, develop and operate a modular & extensible cyber-infrastructure (services, hardware, software) for computational biology in all life sciences (beyond plants) to enable discovery, cloud computing and data storage | Put in place systems, databases, tools and analytical pipelines so plant breeders can routinely apply high density genomic information in cultivar development | Pan-European research infrastructure for biological information which maintains data beyond the duration of projects |
| **Main areas of activity** | [1] Consolidate, expand and maintain plant reference ontologies; [2] develop standards, workflows and tools for ontology development, curation and annotation; [3] provide a portal for ontology-annotated plant genomics data and germplasm; [4] develop semantic query, analysis, and visualization tools for curation and community-based annotation; [5] outreach and training in tools and ontologies | [1] Develop, expand & implement the data repository; [2] develop and link accessory data-query, visualization and analysis tools | [1] Enable safe & secure data storage and data-sharing; [2] provide access to high-performance applications; [3] provide access to common datasets | [1] Build database + API for high-density genotypic data; [2] link genomic database to pedigree database to interpret data in breeders' terms (IBD, haplotypes, etc.); [3] develop breeding schemes and pipelines to incorporate genomic selection in breeding programs; [4] build capacities | - |

| | Laurel Cooper (OSU) | David Marshall (JHI) | Matthew Vaughn (TACC) | Susan McCouch (Univ. Cornell) | Paul Kersey (EMBL-EBI) |
|---|---|---|---|---|---|
| **Progress & highlights** | Recently funded by NSF; grew out of the Plant Ontology and the Gramene project; Plant Ontology collaborates with more than 50 projects and 1,200 terms defined which are linked to 2.2M data points for 23 species (mainly maize, rice, Arabidopsis); Gramene collaborates world over with major plant bioinformatics resources | Currently version 3 (multi-language support; 20-fold quicker data extraction due to Java re-write); has authentication system, interface for smartphones; accessory software includes tools to visualize genetic diversity (3D PCA/PCO plots), graphical genotypes, pedigrees, and comparative maps; graphical genotypes integrated with phenotypic data and linked to 3D diversity visualizer | 1/3rd of funding each dedicated to training, outreach and support; currently 1 petabyte of user data; access to services provided through API in a manner that supports the concept of federation; SoyKB: comprehensive genomics/molecular breeding web resource; genomic variation of 1,000 lines; partnerships with DOE, BBSRC, USDA | Just starting | Included the wheat IWGSC genome survey sequence in Ensembl (EMBL-EBI's genomics-data service); identified between-subgenome variants; implemented RESTful APIs for automatic data access |
| **Challenges encountered** | Integration and application of species-neutral reference vocabularies is challenging; our annotated datasets and education & training have stakeholder to recognize that ontologies enable comparison of data across studies or resources; the widespread adoption and integration in major national and international databases require semi-automated (trained curators) and automated (machine learning) curation workflows and extensive outreach and education | Data-quality issues not always fully recognized by users; missing GbS data; integration of data from multiple sources and platforms; scalability of data storage and analysis approaches; establishing equivalence of lines, loci, phenotypes, etc. | - | - | Polyploid genomes with sequences not contained in the reference; limited quality of known functional information; non-standard representation of individuals, accessions and phenotypes |
| **Controlled vocabulary and ontologies used?** | Yes: Plant Trait Ontology (TO), Plant Stress Ontology (PSO) and Plant Environment Ontology (EO), in addition to Plant Ontology (PO); will also include relevant aspects of Gene Ontology (GO), Cell type (CL), Chemical Entities (ChEBI), Protein Ontology (PRO) and the Phenotypic Qualities Ontology (PATO) | - | Community-dependent | - | reliance on controlled vocabularies |

| | Laurel Cooper (OSU) | David Marshall (JHI) | Matthew Vaughn (TACC) | Susan McCouch (Univ. Cornell) | Paul Kersey (EMBL-EBI) |
|---|---|---|---|---|---|
| **Type of information systems used** | Online portal with ontology browser, visualization tools and APIs; interacts with many external systems; backend: databases with ontology terms and annotations | Online portal with data Java-based warehouse in the background and associated analytical software tools | Online portal that provides access to a high-performance computing, data-storage and data-sharing environment | Backend DNA-sequence database linked, via API, to analytical tools that are pipelined to provide high-level functions such as genomic prediction, haplotype-tracking and decision support functions | DNA sequence databases |
| **Governance & data-sharing** | All data generated by project will be publicly available under a Creative Commons license based on attribution; data provided by collaborators may carry their licenses | Authentication system for different levels of access for different user types | Facilitate publication of data (links to DOIs, etc.); hands-off policy ref. IP, but encourage open-data policy; free data hosting in expectation that data will be made publicly available | - | All data freely available for any purpose; encouraging pre-publication submission of data and compliance with Toronto guidelines for early data release; data generated have time-limited monopoly for analyzing whole data sets; working with funders to normalize data sharing |
| **How could DivSeek add value to project/program?** | DivSeek would contribute to the development and adoption of Planteome resources; we are especially interested in the annotation of genetic variants, their phenotypic consequences, and source germplasm phenotype and passport metadata | - | Share DivSeek data and software tools with iPlant community; include DivSeek metadata standards iPlant Data Commons; engagement with genebank managers and breeders | - | - |
| **How could project/program contribute to DivSeek?** | Can contribute common standards and descriptors, starting with phase-1 studies; contribute to developing data analysis and mining tools and approaches; interested in exploring genetic-diversity domain, annotating phenomics data; training, education and outreach | An online data repository for dissemination of DivSeek data | Provide computational environment & support; distribution mechanism for large & complex data sets | Provide a backend, "under the hood" solution to storage of high-density genotypic data linked to a pedigree framework that facilitates tracking of IBD blocks | Provide access to DivSeek diversity data and phenotypic data linked to variants; maintain sequences of core reference sets (but not individual accessions); possibly: manage variant data for certain species & provide computational framework for comparative genomics; coordinate European efforts |

## Table 3: *Governance and funding*

| | Eric Welch & Selim Louafi (ASU) | Steve Visscher (BBSRC) | Cindy Bell (Genome Canada) |
|---|---|---|---|
| **Name of project or program** | - | BBSRC | Genome Canada |
| **Crop(s)** | - | - | All crops are eligible for funding |
| **Type of effort** | Analysis of existing efforts in the DivSeek domain | Funding research | Funding research |
| **Objectives** | Identify preferred options for (i) governance and management of DivSeek, (ii) elements for a successful governance framework for DivSeek, and (iii) exchange, sharing and use mechanisms for pooled informational resources, and operational guidelines/principles | Fund research and post graduate training sin bioscience | Provide genomics solutions to sectors (including agri-food) that are vital to Canada's economic future |
| **Main areas of activity** | [1] Identify cases of existing projects; [2] analyze 3-4 cases for in-depth study through interviews, analysis of materials, collection of transactional access, exchange and contribution data, assessment of collaboration outcomes and analysis of survey results | [1] Basic research in food security, agriculture and bioscience for health (including nutrition), amongst other areas; [2] development of new 'tools' and national capability resources; [3] support International partnerships and cooperation | Support discovery and applied research as well as development of, and access to leading-edge technologies in the following areas: Agri-food, energy, environment, fisheries & aquaculture, forestry, health and mining |
| **Progress & highlights** | - | Wheat: contributed to global Wheat Initiative with (i) well-defined links among researchers, funders and the private sector, and (ii) expert working groups for key areas, including genetic resources and phenotyping; contributed to International Wheat Yield Partnership (IWYP) | Contribute to IWGSC through support of Curtis Pozniak's work; ongoing competition in agri-food sector which could provide funding for projects feeding into DivSeek |
| **Challenges encountered** | Behavioral impediments to data & material access, exchange and use | Too much work in silos in the past | - |
| **How could DivSeek add value to project/program?** | - | A platform to form strategic, international partnerships in food security, aligned with a general trend towards 'big science'; need for standards to enable interoperability to create synergies and optimize investments | - |
| **How could project/program contribute to DivSeek?** | Examine how other similar efforts have successfully pooled material and information for knowledge generation and innovation to inform DivSeek about how policies, rules, incentives, norms, preferences and technologies affect behavior; identify key design variables for DivSeek governance; identify ways to deal with competing objectives of partners through organizational design | Funding selected areas or topics | Provided support for initiating activities; support DivSeek's principles; participate in DivSeek's governance; funding of large-scale research projects that support DivSeek's mission |

# Annex B:

## Categorization of feedback received during the DivSeek meeting in San Diego (9 Jan 2015)

| Category | Fitting topics mentioned (% hits)[1] | Subcategories | How can DivSeek help you? (% hits)[1] | How can you help DivSeek? (% hits)[1] | Three top priorities for DivSeek? (% hits)[1] | Sum of three questions (% hits)[1] | Topics mentioned (in descending order of % hits)[1] |
|---|---|---|---|---|---|---|---|
| Information management | 50.2 | Data standards & procedures | 4.4 | 1.3 | 12.2 | 17.9 | Data standards & controlled vocabularies for raw data and analysis results including species-independent minimum standards (11.7); direct link of data to accessions and germplasm inventories (2.2); meta-data annotation for meta-analyses and date mining (1.3); working group to link data standards with other initiatives (0.9); data-quality annotation (0.9); data-acquisition procedures (0.9) |
| | | Data bases & repositories | 3.1 | 2.2 | 3.9 | 9.2 | Tools for data storage and dissemination (7.4); go-to portal for crop diversity data (0.4); sustainability and longevity of repositories for analysis results (0.4); data repositories for small crops (0.4) |
| | | Distributed data storage | 0.9 | 1.7 | 3.9 | 6.5 | Enable interoperability of distributed data bases/repositories through APIs & web services (6.1); interoperability with pre-breeding & germplasm enhancement efforts (0.4) |
| | | Centralized data storage | 0 | 0.4 | 1.7 | 2.1 | Hosting of data in centralized storage platform (2.2) |
| | | Data analysis, presentation & interpretation tools | 0.9 | 1.7 | 2.6 | 5.2 | Intuitive user interfaces for targeted user groups (1.7); analytical pipelines (1.3); data visualization & interpretation (0.9); tools to integration information across species (0.9); co-analysis of geo-spatial & genotypic data (0.4) |
| | | Assistance & support | 2.6 | 3.1 | 3.5 | 9.2 | Data-management support and best practices (12); hosting of data (2.2); data-analysis know-how & manpower (1.7) |
| Community & networking | 19.2 | Synergies from working together | 3.9 | 0.4 | 6.1 | 10.4 | Cross-crop collective thinking and sharing of experiences & lessons learned, including with other sectors (4.4); new connections & collaborations with experts and similarly minded colleagues (2.6); landscape of projects & expertise in key areas such as information management (2.2); importance of minor crops and opportunity to benefit from bigger ones (0.9); cross-species analyses (0.4); identification of most pressing common needs, particularly in the area of information-management (0.4); participatory collaboration framework (0.4) |

[1] Percentages were calculated using the total number of references to individual topics/ideas (229) as a denominator

| Category | Fitting topics mentioned (% hits)[1] | Subcategories | How can DivSeek help you? (% hits)[1] | How can you help DivSeek? (% hits)[1] | Three top priorities for DivSeek? (% hits)[1] | Sum of three questions (% hits)[1] | Topics mentioned (in descending order of % hits)[1] |
|---|---|---|---|---|---|---|---|
| | | Opportunities from joint action or advocacy | 12 | 2.6 | 0.9 | 15.5 | Increased visibility of own projects, expertise, data or tools (3.1); links to other stakeholders, organizations, initiatives or consortia of relevance, including on an international scale (breeders, informatics consortia, large IT companies, crop-specific consortia) (3.1); DivSeek "endorsement" for new projects (0.9); joint awareness raising and advocacy (0.9) |
| **Research strategies** | 15.7 | Accession-sampling strategies | 0 | 1.3 | 1.7 | 3.0 | How to sample individual accessions for genotyping/sequencing (single seeds, SSD, pools, etc.) and how to link back to original accessions (2.2); large-scale phenotyping strategies (0.4); cross-institutional characterization & evaluation of accessions (0.4) |
| | | Genotyping & sequencing methods | 0.9 | 0.9 | 1.7 | 3.5 | Standardization of genotyping/sequencing methods (1.3); Genotyping/sequencing methods for small crops (0.9); Data quality of genotyping/sequencing methods and potentially confounding effects of epigenetics (0.9); Use of multiple reference genome sequences (0.4) |
| | | Phenotyping methods | 0 | 2.2 | 1.3 | 3.5 | Standards, methods & experimental design (1.3); HTP field-based methods & environmental monitoring (1.3); HTP controlled-environment methods & platforms (0.9) |
| | | Intended impacts | 1.7 | 0.9 | 3.1 | 5.7 | Mobilization of crop diversity for breeding (1.7); define and deliver a few pilot examples, including for a small crop (1.7); operational efficiency of genebanks (0.9); reduce duplication across genebanks (0.9); more targeted access to germplasm (0.4) |
| **PGR-related rights** | 5.2 | Data & germplasm-related rights & sharing principles | 1.7 | 0 | 3.5 | 5.2 | Data-sharing rules (2.2); germplasm access/sharing (non-Annex-1 crops, exchange with national genebanks, transfer of new materials to international genebanks) (1.7); align IP principles with other initiatives (0.9); effect of international treaties on germplasm access/exchange) (0.4) |
| **Funding for projects** | 3.5 | Access to funding | 1.7 | 0.4 | 1.3 | 3.4 | Greater leverage through joint fundraising efforts (1.7); DivSeek to provide funding for crop-specific projects (0.9); DivSeek adds value to institutional investments (0.4); in-kind contribution to DivSeek efforts (0.4) |
| **Crop data sets** | 3.5 | Data sets from crop-specific projects | 0 | 3.1 | 0.4 | 3.5 | Data sets from crop-specific projects (3.1); digitalization of valuable paper records (0.4) |
| **Capacity-building** | 2.6 | Tools and know-how in new technologies | 0.9 | 0 | 1.7 | 2.6 | Training in (tools for) data analysis (1.3); targeted at developing countries (0.9); training in new genotyping/phenotyping technologies (0.4) |

# Report on the DivSeek Technical Meeting on January 9th, 2015

## Part 1: Summary of presentations & discussions

A total of four presentations from Kevin Pixley (CIMMYT), Ruaraidh Sackville Hamilton (IRRI), Nils Stein (IPK), and Rajeev Varshney (ICRISAT), covered *ongoing efforts to* characterize and utilize genebank collections by making use of next-generation sequencing platforms, often in combination with large-scale phenotyping efforts and, in one example, pre-breeding programs (Annex A, Table 1). Depending on genome size and number of accessions characterized, either *genotyping-by-sequencing* or *whole-genome resequencing* approaches are the method of choice. Data management-related issues were mentioned repeatedly when stating how DivSeek could contribute to these individual, crop-specific efforts. This is consistent with the feedback received from other Partners via the questionnaire (see Part 2, Annex B).

Theo van Hintum's (CGN) presentation as a representative of national genebanks who are not currently involved in such kind of projects, highlighted the need to closely involve genebank managers in DivSeek projects. He also stressed the importance of (a) linking data generated in these projects to the actual accessions in genebanks, and (b) providing this data back to genebank managers, so that they can better service genebank clients (Annex A, Table 1). Wayne Powell (CGIARG Consortium Office) stressed the dominant role of the CGIAR genebanks on an international level as well as their key role as providers of accessions for DivSeek projects. Table 1 (Annex A) contains more details from a side-by-side comparison of seminars delivered by these speakers, to identify potential communalities and complementarities among ongoing efforts and points of view.

A second group of presentations focused on *information management* and presented software platforms and ontology frameworks that are being, or soon will be developed for somewhat similar purposes. These include the Planteom platform (Laurel Cooper, OSU), the Germinate data repository (David Marshall, JHI), iPlant (Matthew Vaughn, TACC), the GOBBI platform (Susan McCouch, Cornell Univ.) and the ELIXIR platform (Paul Kersey, EMBL-EBI) (Annex A, Table 2). It would appear that different platforms have different unique features and could cover a variety of DivSeek data domains and required functionalities, provided that interoperability among them can be achieved. Again, Table 2 (Annex A) compares the features of these information systems side-by-side for greater clarity.

Table 3 (Annex A) summarizes ideas and views in the area of community governance and from a funding agencies' perspective. Eric Welch & Selim Louafi (ASU) proposed a study to explore governance and management options for DivSeek, for consideration by the community, by investigating comparable efforts in similar areas. This study would review selected cases based

on parameters such as resource characteristics, goals, geographic focus, structure and management, access requirements, and the terms of contribution and use. Steve Visscher and Cindy Bell line out some pre-conditions under which BBSRC and Genome Canada might be interested in funding selected DivSeek projects.

As mentioned, Tables 1, 2 and 3 of Annex A contain more details and should serve as a quick reference to identify potential communalities and complementarities among ongoing efforts and prevailing ideas.

The discussions after the presentations revolved around the following topics:

- What should be the balance among different crops, and how can minor crops learn from larger ones?
- The community represented during the meeting probably was incomplete; there is a need to draw in more partners, particularly from developing countries
- DivSeek should bring together previously unconnected stakeholders, particularly those who have good access to germplasm with those who have good access to technologies
- DivSeek should provide easy access to genotyping services for those who otherwise do not have good access (i.e., similar to what has been done by the Generation Challenge Program)
- What other data types (beyond genotypic and phenotypic information) should be included (transcriptomics, proteomics)?
- Integration across information domains is critical and requires elements such as (i) well-defined data about samples, (ii) data-quality descriptors, (iii) QC systems, (iv) training and engagement, (v) data curators who are familiar with study objectives, (vi) data scientist working hand-in-hand with germplasm specialists, (vii) sufficient opportunities and iterations for exchanging data to identify and learn from mistakes, etc.
- There's a need to link data across different communities who typically do not collaborate much and do not have a common business model
- It is important to identify the highest-impact opportunities and focus on them first: what are the low-hanging fruits for the first year? What are the expectations?

## Part 2: Analysis of feedback received

You may remember that the questionnaire included the three following questions:

- *How can DivSeek help you to increase the impact of your work?*
- *What could you contribute to DivSeek?*
- *What should be the three top priorities for DivSeek to work on?*

A total of 31 written responses to the questionnaire, some of them extensive, were received. We identified 59 individual topics or ideas in these answers (e.g., "elaboration of data standards", "sharing of lessons learned", etc.) and counted how often each of them was mentioned across all survey participants (in total, there were 229 references to individual topics or ideas). We then

grouped these topics into categories and ranked the categories according the number of "hits" they got. Here is a high-level summary:

- Information management: 50.2%[1]
- Community & networking: 19.2%
- Research strategies: 15.7%
- PGR-related rights: 5.2%
- Funding for projects: 3.4%
- Crop data sets: 3.5%
- Capacity building: 2.6%

Clearly, the area of information management (data standards, data bases/repositories, analysis tools, etc.) seems to be on the majority of almost everyone's mind, followed by topics related to building a DivSeek community by creating synergies among individual efforts and promoting joint action and advocacy efforts. Annex B contains more details from this analysis, including individual topics/ideas you've put forward.

The results from this questionnaire provide a basis upon which the incoming *Steering Committee*, with support from the *Joint Facilitation Unit*, will develop an initial program of work for DivSeek.

[1] i.e. 115 of 229 hits

**Susan Mc Kinney**

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:20 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: DivSeek 2016 San Diego
**Attachments:** Agenda Jan 2016-1.pdf

---------- Forwarded message ----------
From: **Divseek Meetings** <meetings@divseek.org>
Date: Tue, Dec 15, 2015 at 4:40 AM
Subject: DivSeek 2016 San Diego
To:

Dear DivSeek partners and colleagues interested in DivSeek,

As per the email you received from Susan McCouch, DivSeek Chair, last month.

The DivSeek Initiative will hold a roundtable discussion between 13:00 and 17:00 on January 8, 2016. The location for the meeting at will be the Handlery Hotel 950 Hotel Circle, San Diego, USA.

An agenda for the meeting is attached.

We **invite 1-2 members from your organization** to attend.

If you haven't already done so can you please email to confirm whether or not your organization will be represented at the meeting and who will be attending?

Please note that as part of the discussions during the meeting we will address possible future DivSeek workshops. If you would like to submit a suggestion for workshop please send it by email by the 31st December 2015.

The proposal should be 1 page in length and needs to fits into one of following three categories

- community-building
- standard setting
- capacity-building

The proposal should also clearly state the following:

- goals of the workshop
- outline of topics or questions to be addressed
- suggested number and type of participants
- duration of workshop (number of days)
- possible venue(s)
- possible funding source to support the workshop

We hope to see you at the DivSeek roundtable discussion on Jan. 8 in San Diego, and we look forward to your input!

Regards and best wishes,

*Ruth Bastow*

--
James M. Bradeen
Professor & Head

University of Minnesota
Department of Plant Pathology
Stakman-Borlaug Center for Sustainable Plant Health
jbradeen@umn.edu
http://plpa.cfans.umn.edu
http://sbc.umn.edu

**Connect with Plant Pathology:**

# DivSeek Roundtable Discussions

## 8 January 2016

**Terrace Room, Handlery Hotel**

**950 Hotel Circle, San Diego, USA**

## Draft Provisional Agenda

| | |
|---|---|
| 13:00 – 13:15 | Welcome and opening of the meeting |
| | **DivSeek Updates** |
| 13:15 – 13:45 | Draft Landscape Study – Ruth Bastow and David Marshall |
| | Open Discussion |
| 13:45 – 14:30 | Interim Workplan – Susan McCouch and Peter Wenzl |
| | Open Discussion |
| 14:30 – 15:00 | Governance – Emily Marden and Peter Philips |
| | Open Discussion |
| 15:00 – 15:30 | Break |

| | |
|---|---|
| | **Start-Up Activities** |
| 15:30 – 16:00 | Permanent Unique Identifiers for germplasm – Susan McCouch and Ruaraidh Sackville Hamilton |
| | Open Discussion |
| 16:00 – 16:30 | Proposed DivSeek Workshops – Elizabeth Arnaud and Ruth Bastow |
| | Open Discusssion |
| 16:30 – 17:00 | Open Discussion |
| 17:00 | Meeting Close |

**Susan Mc Kinney**

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:20 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: Invitation to a DivSeek roundtable discussion

---------- Forwarded message ----------
From: **Divseek Meetings** <meetings@divseek.org>
Date: Thu, Nov 12, 2015 at 12:55 AM
Subject: Invitation to a DivSeek roundtable discussion
To: Divseek Meetings <meetings@divseek.org>

Dear DivSeek partners and colleagues interested in DivSeek,

The DivSeek Initiative will convene a **roundtable discussion between 13:00 and 17:00 on January 8, 2016, in San Diego**. The focus will be to solicit input about DivSeek's role and identity in the larger landscape, its organizational structure, and its role in promoting access to and exchange of genetic diversity data.

We **invite 1-2 members from your organization** to attend and will follow up shortly with details about the venue.

In the meantime, we provide some updates on DivSeek activities. The DivSeek Charter has now been endorsed by 59 organizations. Since the Partners' Assembly (PA) meeting in January 2015 in San Diego, eight Steering Committee (SC) members were elected through electronic voting; the first SC meeting was held in Rome in May 2015 and the second is to be held in Bonn in December 2015. The 2016 Partners' Assembly will take place during spring-summer and will be announced as soon as that date is set.

According to the Charter, the DivSeek Initiative aims to (1) facilitate networking among partners interested in the application of state-of-the-art genotyping and phenotyping technologies to deepen our understanding of crop diversity, (2) promote the development of common standards to link germplasm with characterization data and to enable interoperability among information systems, (3) develop an annual work plan with a budget and a resource mobilization plan, and (4) organize capacity-building workshops.

In keeping with these stated goals and principles, DivSeek has been undertaking a landscaping study to take stock of ongoing research that is relevant to the Initiative, providing the basis for discussing DivSeek's identity in a larger context.

In addition, over the course of the year, an SC subcommittee was tasked to help identify an organizational (governance) structure that will enable DivSeek to define and execute a work plan and seek external funding. DivSeek has supported the use of permanent unique identifiers (PUIDs) for tracking germplasm and facilitating data integration. A study funded by JFU member organizations at Arizona State University (ASU) was asked to examine strategies for data sharing in other community-driven initiatives to provide a foundation for a discussion about DivSeek policies. Finally, several

capacity building workshops are being organized to promote the adoption of standards and sharing of data and information.

The **topics for discussion** at the January roundtable include:

- **The identity of DivSeek**. The landscaping study documents more than 50 projects relevant to DivSeek goals and principles that are currently underway around the world (see http://www.divseek.org/landscape for a draft list). These projects either focus on evaluating over a dozen crops at the genotypic and phenotypic levels or the development of information systems, software tools and data standards. How should DivSeek interact with these projects to help researchers network, develop and adopt common standards, improve interoperability among information systems, and promote information sharing?

- **Data sharing and private-sector involvement**. The team at ASU will summarize its findings from a study on data-sharing in genetics research based on a review of eight community-driven initiatives. Lessons learned will be presented in the context of DivSeek to seek input from public and private sector colleagues.

- **DivSeek organizational structure**. A report from the SC will outline a refined organizational (governance) structure that should enable DivSeek to become more inclusive, responsive, and capable of launching externally-funded projects.

- **Permanent Unique Identifiers (PUID)**. DivSeek supports the use of PUID for crop germplasm as a way to track samples, link them to genotypic and phenotypic information, enable data integration, and promote interoperability among diverse information systems. We will update you on progress in this area.

- **Capacity Building**. Members of the SC are exploring the possibility that DivSeek co-organize capacity-building workshops, including training in ontologies and developing standards for integrating data across species, geographies and laboratories. We are seeking your guidance on areas to prioritize.

We hope to see you at the DivSeek roundtable discussion on Jan. 8 in San Diego, and we look forward to your input!

Regards and best wishes,

*Susan McCouch*
--
Chair, DivSeek Partners' Assembly

--
James M. Bradeen
Professor & Head
University of Minnesota
Department of Plant Pathology
Stakman-Borlaug Center for Sustainable Plant Health
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**Connect with Plant Pathology:**

## Susan Mc Kinney

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:19 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: Note from the DivSeek Chair
**Attachments:** Note from the DivSeek Chair_150626.docx; Preliminary Landscape Study.xlsx

---------- Forwarded message ----------
From: **Susan McCouch** <susan.mccouch@divseek.org>
Date: Fri, Jun 26, 2015 at 10:45 AM
Subject: Note from the DivSeek Chair
To: srm4@cornell.edu

**The DivSeek Steering Committee gets going**

Dear DivSeek partners and colleagues interested in DivSeek,

On May 28th, the newly elected DivSeek Steering Committee (SC) gathered at the FAO premises in Rome. Members of the Joint Facilitation Unit (JFU) and additional staff of the International Treaty also participated in the first SC meeting.

As an initial step, the SC reviewed a draft that which takes stock of independently funded projects in areas of relevance for DivSeek. This 'project landscape' study identified around 50 (!) projects, including projects characterizing genebank accessions, web-based portals to access crop-diversity data, and projects developing software or data standards for sharing information about crop diversity.

The SC also began discussing components of a multi-year strategy and an initial work plan for DivSeek. This discussion was facilitated by a document containing a 'menu' of ideas and potential elements for such a strategy.

The current task of the SC is to identify a set of objectives and activities for the DivSeek initiative and a mechanism for funding and administering those activities. A major goal underlying DivSeek's strategic plan would be to augment the potential for many independent, stand-alone efforts to work together under a common umbrella to apply state-of-the-art genomic, phenomic, molecular and bioinformatics tools and strategies to characterize crop diversity and to integrate and share data and information. A second goal would be to enhance the utilization of crop diversity in plant breeding programs that seek to enhance local and global food and nutritional security.

Governance-related topics that are critical to success of the DivSeek initiative were also discussed, including private-sector engagement, recruitment of new members to expand DivSeek's constituency, and examination of the roles and responsibilities of the JFU, the SC and the Partners Assembly (PA) as the initiative evolves.

Among the next steps --

• The JFU was encouraged to expand and refine the 'project landscape' study, and to make results available online through the DivSeek website and as a peer-reviewed publication. Please see attached list of currently funded projects relevant to the DivSeek initiative and let us know of any others that you would like to see included in the survey (info@divseek.org).

• During the coming months, the SC, with support from the JFU, will elaborate a proposal for a multi-year DivSeek strategy. We expect to share this proposal and an initial work plan with DivSeek Partners at the next Assembly, in January 2016. The strategy will include ideas for working groups and workshops on key topics of broad interest.

• An independent governance-expert committee was convened to propose a framework for engaging with the private sector, outline guidelines for publishing DivSeek documents, clarify the governance structure of DivSeek and describe lines of communication and governance principles that will allow it to remain flexible and evolve in the future.

I take this moment to reflect on the mission of the DivSeek initiative, which is to help unlock the potential of crop diversity so it can be utilized to enhance the productivity, sustainability and resilience of crops and agricultural systems throughout the world. The mission is multi-faceted and we count on the input and support of DivSeek's partners to help us move forward.

Susan McCouch

--
James M. Bradeen
Professor & Head
University of Minnesota
Department of Plant Pathology
Stakman-Borlaug Center for Sustainable Plant Health
jbradeen@umn.edu
http://plpa.cfans.umn.edu
http://sbc.umn.edu

**Connect with Plant Pathology:**

**Note from the DivSeek Chair: The DivSeek Steering Committee gets going**

Dear DivSeek partners and colleagues interested in DivSeek,

On May 28th, the newly elected DivSeek Steering Committee (SC) gathered at the FAO premises in Rome. Members of the Joint Facilitation Unit (JFU) and additional staff of the International Treaty also participated in the first SC meeting.

As an initial step, the SC reviewed a draft that which takes stock of independently funded projects in areas of relevance for DivSeek. This 'project landscape' study identified around 50 (!) projects, including projects characterizing genebank accessions, web-based portals to access crop-diversity data, and projects developing software or data standards for sharing information about crop diversity.

The SC also began discussing components of a multi-year strategy and an initial work plan for DivSeek. This discussion was facilitated by a document containing a 'menu' of ideas and potential elements for such a strategy.

The current task of the SC is to identify a set of objectives and activities for the DivSeek initiative and a mechanism for funding and administering those activities. A major goal underlying DivSeek's strategic plan would be to augment the potential for many independent, stand-alone efforts to work together under a common umbrella to apply state-of-the-art genomic, phenomic, molecular and bioinformatics tools and strategies to characterize crop diversity and to integrate and share data and information. A second goal would be to enhance the utilization of crop diversity in plant breeding programs that seek to enhance local and global food and nutritional security.

Governance-related topics that are critical to success of the DivSeek initiative were also discussed, including private-sector engagement, recruitment of new members to expand DivSeek's constituency, and examination of the roles and responsibilities of the JFU, the SC and the Partners Assembly (PA) as the initiative evolves.

Among the next steps --

- The JFU was encouraged to expand and refine the 'project landscape' study, and to make results available online through the DivSeek website and as a peer-reviewed publication. Please see attached list of currently funded projects relevant to the DivSeek initiative and let us know of any others that you would like to see included in the survey (info@divseek.org).

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I take this moment to reflect on the mission of the DivSeek initiative, which is to help unlock the potential of crop diversity so it can be utilized to enhance the productivity, sustainability and resilience of crops and agricultural systems throughout the world. The mission is multi-faceted and we count on the input and support of DivSeek's partners to help us move forward.

Susan McCouch

## Susan Mc Kinney

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:18 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: Announcing election results for DivSeek Steering Committee members

---------- Forwarded message ----------
From: **Susan McCouch** <srm4@cornell.edu>
Date: Tue, Mar 10, 2015 at 11:39 AM
Subject: Announcing election results for DivSeek Steering Committee members
To: Susan McCouch <srm4@cornell.edu>
Cc: Ruth Bastow <ruth.bastow@divseek.org>, Peter Wenzl <peter.wenzl@croptrust.org>, Peter Phillips <peter.phillips@usask.ca>, Daniele Manzella <daniele.manzella@divseek.org>

Dear Partner Organizations,

With this message, I would like to share with you the results of the Steering Committee elections.

We received a total of 19 (nineteen) candidates for the Steering Committee, 48 (forty-eight) organizations voted, and the Joint Facilitation Unit counted the votes after the deadline of 6 March.

I am pleased to announce the following results:

1. Andreas Graner - Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) - 2 years

2. Ruaraidh Sackville-Hamilton - International Rice Research Institute (IRRI), Philippines - 2 years

3. Elizabeth Arnaud - Bioversity International, France - 2 years

4. David Marshall - James Hutton Institute, UK - 2 years

5. Emily Marden - University of British Columbia, Canada - 1 year

6. Peter Bretting - US Department of Agriculture–Agricultural Research Service (USDA–ARS), USA - 1 year

7. Sarah Ayling - The Genome Analysis Centre (TGAC), UK - 1 year

8. Rajeev Varshney – International Crop Research Institute for Semi Arid Topics (ICRISAT), India - 1 year.

Please join me in congratulating our new Steering Committee Members, and in thanking them for their commitment to contribute to the DivSeek initiative. I am confident that the DivSeek community will greatly benefit from the expertise of this Steering Committee, and we look forward to working closely with them.

Work is already underway, and we are planning two meetings of the Committee in order to develop the first programme of work and to implement other actions requested by the Assembly. I will continue to communicate with you on a regular basis on the progress being made in advance of the next Partners' Assembly, and am

looking forward to the exciting developments ahead.

With kind regards,

Susan McCouch
Chairperson of the Assembly

--
Susan McCouch
Professor, Plant Breeding & Genetics
Cornell University
162 Emerson Hall
Ithaca, NY 14853-1901
Phone: +1 607-255-0420
Fax: +1 607-255-6683
Email: srm4@cornell.edu or mccouch@cornell.edu
Alternate Email: Susan.McCouch@gmail.com

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James M. Bradeen
Professor & Head
University of Minnesota
Department of Plant Pathology
Stakman-Borlaug Center for Sustainable Plant Health
jbradeen@umn.edu
http://plpa.cfans.umn.edu
http://sbc.umn.edu

**Connect with Plant Pathology:**

## Susan Mc Kinney

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:18 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: DivSeek Steering Committee Election Closes 6th March
**Attachments:** DivSeek SC Voting Form.pdf

---------- Forwarded message ----------
From: **Gary Muehlbauer** <muehl003@umn.edu>
Date: Thu, Mar 5, 2015 at 1:16 PM
Subject: Re: DivSeek Steering Committee Election Closes 6th March
To: Ruth Bastow <ruth.bastow@divseek.org>

Ruth,

Jim and I decided that I would vote for the University of Minnesota. Attached is my vote for the DivSeek steering committee.

Gary

On Thu, Mar 5, 2015 at 11:45 AM, Ruth Bastow <ruth.bastow@divseek.org> wrote:

> Dear Both
>
> Please note that the election for the **DivSeek Steering Committee closes on Friday 6th March** so please ensure that you have returned your completed form to (ruth.bastow@divseek.org) by this deadline.
>
> The original email regarding the voting process sent on the 25th February is provided below.
>
> I look forward to receiving your voting form.
>
> Kind regards,
>
> Ruth Bastow
>
> (on behalf of the Joint Facilitation Unit)
>
> www.divseek.org
>
> Dear Both
>
> I am contacting you on behalf of the DivSeek Joint Facilitation Unit regarding the election process for the **DivSeek Steering Committee,** as your organization, is a partner in the DivSeek Initiative.

We have received nineteen (19) nominations for election to Steering Committee. A full list of candidates and associated short biographies are provided in the attachment to this email, together with the **voting form**.

On the voting form, please select **eight (8)** nominees and place them in ranked order (the most preferred nominee being in position 1). Please return the completed form by **6 March** to Ruth Bastow (ruth.bastow@divseek.org).

Please note that each partner organization can only submit **ONE** completed voting form.

We would also ask that each voting partner organization consider the composition of the eight-member steering committee with regards to different categories of expertise, regions and types of organizations, as set forth in the DivSeek Charter.

The Joint Facilitation Unit will be responsible for collecting the forms and processing the results.

After close of the election, the Chairperson of the Assembly will confirm the willingness of the elected candidates to serve, including on the basis of the aforementioned balancing criteria, and communicate the final composition of the Steering Committee to DivSeek Partners.

The first Steering Committee will have staggered appointments, with four of the members appointed for two years and the other four for one year. All the members will be eligible for a second term of two years. The four top-ranked elected candidates will be assigned a two-year term; the next four will be assigned a one-year term.

The Steering Committee provides an active link to the community that underpins the DivSeek Initiative. It plays a key role in ensuring that DivSeek meets its strategic objectives, as outlined by the Partners' Assembly. The Committee works with the Joint Facilitation Unit to develop an annual work plan. It meets twice a year, and may also have additional Skype/phone calls in between meetings. The functions of the Steering Committee as outlined in the Charter (attached) are:

To prepare the agenda for the Assembly;

To provide inputs and eventually endorse the draft DivSeek annual work plan and the draft budget of the Joint Facilitation Unit, accompanied by a resource mobilization plan, and the annual progress report;

To periodically collect information about interactions among Partners and convey such information to the Assembly;

To advise the Assembly on the strategic direction of activities and projects associated with DivSeek;

To work with the Joint Facilitation Unit to prepare and present information and updates on DivSeek for the constituencies and governing bodies of the institutions providing the Joint Facilitation Unit.

As usual, please do not hesitate to ask the Joint Facilitation Unit for any clarification we may provide.

Kind regards,

Ruth Bastow

(on behalf of the Joint Facilitation Unit)

www.divseek.org

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Gary J. Muehlbauer
Distinguished McKnight University Professor and Head, Department of Plant Biology
Endowed Chair in Molecular Genetics of Crop Improvement
Department of Agronomy and Plant Genetics
University of Minnesota
St. Paul, MN 55108
Phone: 612-624-2755

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James M. Bradeen
Professor & Head
University of Minnesota
Department of Plant Pathology
Stakman-Borlaug Center for Sustainable Plant Health
jbradeen@umn.edu
http://plpa.cfans.umn.edu
http://sbc.umn.edu

**Connect with Plant Pathology:**

**Susan Mc Kinney**

**From:** James Bradeen
**Sent:** Monday, December 28, 2015 11:01 AM
**To:** Susan Mc Kinney
**Subject:** Fwd: DivSeek Steering Committee Election
**Attachments:** DivSeek Charter & list of partners February 2015.pdf; DivSeek SC Voting Form.pdf; DivSeek Steering Committee Nominees.pdf

---------- Forwarded message ----------
From: **Ruth Bastow** <ruth.bastow@divseek.org>
Date: Wed, Feb 25, 2015 at 12:19 PM
Subject: DivSeek Steering Committee Election
To: James Bradeen <brade005@umn.edu>, Gary Muehlbauer <muehl003@umn.edu>

Dear Both

I am contacting you on behalf of the DivSeek Joint Facilitation Unit regarding the election process for the **DivSeek Steering Committee,** as your organization, University of Minnesota, is a partner in the DivSeek Initiative.

We have received nineteen (19) nominations for election to Steering Committee. A full list of candidates and associated short biographies are provided in the attachment to this email, together with the **voting form**.

On the voting form, please select **eight (8)** nominees and place them in ranked order (the most preferred nominee being in position 1). Please return the completed form by **6 March** to Ruth Bastow (ruth.bastow@divseek.org).

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As usual, please do not hesitate to ask the Joint Facilitation Unit for any clarification we may provide.

Kind regards,

Ruth Bastow

(on behalf of the Joint Facilitation Unit)

www.divseek.org

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James M. Bradeen
Professor & Head
University of Minnesota
Department of Plant Pathology
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**Connect with Plant Pathology:**

# 5th International Conference on Next Generation Genomics and Integrated Breeding for Crop Improvement

V NGGIBCI

ICRISAT, Hyderabad, India

February 18 - 20, 2015

## Key Speakers/ Participants

**Gary Atlin,** Bill & Melinda Gates Foundation, USA
**Hélène Berges',** *CNRGV - INRA, France*
**Doug Cook,** *University of California-Davis, USA*
**Jose Crossa,** *CIMMYT, Mexico*
**Swapan K Datta,** *Indian Council of Agricultural Research, India*
**Hannes Dempewolf,** *Global Crop Diversity Trust, Germany*
**Dave Edwards,** *University of Queensland, Australia*
**Jeffrey Ehlers,** *Bill & Melinda Gates Foundation, USA*
**Andreas Graner,** *IPK-Gatersleben, Germany*
*** Hari S Gupta,** *Borlaug Institute for South Asia, India*
**Pushpendra K Gupta,** *CCS University, India*
**Robert Henry,** *University of Queensland, Australia*
**Emma Huang,** *CSIRO, Australia*
**John Hickey,** *University of Edinburgh, UK*
**Scott Jackson,** *University of Georgia, USA*
**Suk-Ha Lee,** *Seol National University, Korea*
***Hei Leung,** *IRRI, The Philippines*
**David Marshall,** *The James Hutton Institute, UK*
***Greg May,** *DuPont Pioneer, USA*
***Kenneth McNally,** *IRRI, The Philippines*
**Trilochan Mohapatra,** *Central Rice Research Institute, India*
**Henry T. Nguyen,** *University of Missouri, USA*
**Frank Ordon,** *Julius Kühn-Institut, IRRST, Germany*
**Deepak Pental,** *University of Delhi, India*
***Jesse Poland,** *Kansas State University, USA*
**BM Prasanna,** *CIMMYT-Nairobi, Kenya*
**Jean-Marcel Ribaut,** *Generation Challenge Programme, Mexico*
**Steve Rounsley,** *DowAgro, USA*
**Patrick Schnable,** *Iowa State University, USA*
**Howard Yana-Shapiro,** *MARS Inc, USA*
**Andrew Sharpe,** *National Research Council of Canada, Canada*
**E A Siddiq,** *Institute of Biotechnology, ANGRAU, India*
***Ashok K Singh,** *Indian Agricultural Research Institute, India*
***Nagendra K Singh,** *NRCPB, India*
**David Somers,** *Monsanto, USA*
**Mark E Sorells,** *Cornell University, USA*
**German C Spangenberg,** *Dept. of Environ. and Pri. Ind., Australia*
**Nils Stein,** *IPK-Gatersleben, Germany*
**Tim Sutton,** *ACPFG, University of Adelaide, Australia*
**Peter Wenzl,** *CIMMYT, Mexico*
**Gengyun Zhang,** *BGI, China*

***…….more speakers to be joined soon***

***yet to be confirmed**

## Welcome!

Better communication and sharing of the ideas among scientists and stakeholders are critical to achieve the goal of global food security. This conference will provide a platform for scientists to interact with each other, present their work and discuss different aspects of modern genomics and breeding for crop improvement.

The conference will be organized under well-structured technical sessions that will include invited lectures by eminent speakers in the fields of genetics, genomics, breeding and allied sciences. A poster session will also be arranged to encourage participation of young researchers in the conference.

You, your colleagues and collaborators are invited to contribute to the scientifically rich meeting and explore the historical city of India in a pleasant weather!!

## Registration*

| | Regular | Student |
|---|---|---|
| **Early Bird (before Dec 15, 2014)** | | |
| Indian National | INR 12,000 | INR 8,000 |
| Foreign National | US$ 400 | US$ 300 |
| **Late (before Jan 15, 2015)** | | |
| Indian National | INR 14,000 | INR 10,000 |
| Foreign National | US$ 500 | US$ 400 |

*The conference will accept only 150 registered participants. Industry participants need to contact Organizers.

## Accommodation

Special negotiations are being made with a range of budget hotels in the vicinity of ICRISAT. Details about booking accommodation will be available on the website starting from November 1, 2014 (www.vnggibci.icrisat.org).

## Conference Themes

- Next generation genomics
- Novel mapping approaches and QTLs
- Advances in phenotyping and trait mapping
- Marker-assisted selection / backcrossing
- Genomic selection
- Decision support tools for breeding
- New horizons for crop improvement

## Conference Organizer

**Rajeev K Varshney**
**Center of Excellence in Genomics (CEG)**
**ICRISAT**
**Hyderabad-502324**
**India**
**Tel:** +91 40 30713305, +91 40 30713387
**Email:** nggib2015@gmail.com
**Web:** www.vnggibci.icrisat.org


# DivSeek Steering Committee Election

# 2015

# DivSeek Steering Committee Nominees


# Michael T Abberton

**International Institute of Tropical Agriculture (IITA), Nigeria**

IITA, PMB 5320, Oyo Rd, Ibadan, Nigeria


Michael Abberton has been Head of the Genetic Resources Centre, IITA, Ibadan since August 2012. He obtained his BSc in Botany and PhD in Plant Cytogenetics from the University of Manchester, UK, and subsequently undertook postdoctoral research in Molecular Biology at the University of St Andrews, UK. Following two years working on coffee germplasm improvement in Malawi, he joined the Institute of Grassland and Environmental Research (IGER), Aberystwyth, UK in 1993. For a number of years he carried out research and breeding in forage legumes and became Head of the Plant Genetics and Breeding Department at IGER. Following a merger with Aberystwyth University in 2008 (creating the Institute of Biological, Environmental and Rural Sciences [IBERS]) he became Professor of Public Good Plant Breeding and Director of International Development.


# Elizabeth Arnaud

**Bioversity International**

Norwich Parc Scientifique Agropolis II,1990 Boulevard de la Lironde, 34397 Montpellier, France.


Elizabeth holds a MSc in Biology and a Master in Scientific data management techniques and communication and is based at the Bioversity International Montpellier office. When she joined Bioversity, ELizabeth coordinated the Musa Germplasm Information System (MGIS) and then, the CGIAR System-wide Information System on Genetic Resources (SINGER), the development of the Bioversity geospatial database for collected crop samples and since 2008, has led the Crop Ontology project of the Generation Challenge Programme developed with CGIAR Research Centers and partners. The Crop Ontology project is contributing to the Integrated Breeding Platform (IBP) and to the newly NSF-funded project called Planteome, led by Oregon State University, US, that aims to develop a set of reference ontologies for plants. Elizabeth is co-Principal Investigator of the Planteome project. She was the chair of the 2009 conference of the Biodiversity Informatics Standards (TDWG), Montpellier. Elizabeth is the head of Bioversity's delegation in the Global Biodiversity Information Facility (GBIF) Governing Body and since 2012, she a member of the GBIF Scientific Committee.


## Sarah Ayling

**The Genome Analysis Centre (TGAC), UK**

Norwich Research Park, Norwich, NR4 7UH, UK


Sarah Ayling leads the Crop Genomics and Diversity group at The Genome Analysis Centre (TGAC). The group's focus is to support crop improvement through the application of genomics approaches. The group works on genome assembly, annotation, identification of variants and development of genomics tools and resources. Current species of interest include wheat, barley, rice, brassicas, pea, yam and forages.

Prior to joining TGAC in 2011, Sarah spent two years at the Centro Internacional de Agricultura Tropical (CIAT), Colombia, where she worked as a bioinformatician supporting the bean, cassava, rice and tropical forage programs. She also worked on the development of a laboratory information management system (LIMS). From 2008–2009 Sarah worked on the domestication of einkorn wheat at the University of Manchester, UK. From 2005–2007 she was employed as a software developer within the Ensembl project, running and developing the automated genome annotation pipelines. Sarah completed her bioinformatics PhD in 2006 studying phylogenetic network approaches and visualization. She has a keen interest in making genebank materials more accessible to the community and produced a technical report on the feasibility of sequencing collections for the Global Crop Diversity Trust in 2012.


# James (Jim) Bradeen

**University of Minnesota, USA**

Department of Plant Pathology, 1991 Upper Buford Circle, Saint Paul, MN 55108, United States


Jim Bradeen is Professor and Head of the Department of Plant Pathology at the University of Minnesota, US. Jim has a broad background in the plant sciences including degrees in Horticulture (Michigan State University, US) and Plant Breeding and Genetics (University of Wisconsin, US). Jim has almost 30 years of experience researching wild species related to a variety of crop plants. His current research integrates genomics and informatics approaches to efficiently identify useful disease resistance genes in wild species in the *Solanaceae* and *Rosaceae*. As Department Head, Jim represents 27 faculty working in all aspects of plant pathology including (1) disease biology and management, (2) genetics and genomics of disease resistance, and (3) pathogenomics and microbiology. Jim is co-Founder and co-Director of the University of Minnesota's Stakman-Borlaug Center for Sustainable Plant Health, a multi-disciplinary center that unites researchers and educators to solve plant health problems that impact food security and ecosystem health. Research on Crop Wild Relatives is a priority area for both the Department of Plant Pathology and the Stakman-Borlaug Center. Accordingly, Jim recently launched a Crop Wild Relatives Working Group at the University of Minnesota, providing a framework for intellectual discourse among plant scientists, evolutionary biologists, applied economists, social scientists, and legal experts around the use of genebank collections for crop improvement.


# Peter Breeting

**US Department of Agriculture–Agricultural Research Service (USDA–ARS), USA**

Mailstop 5139, 5601 Sunnyside Avenue, Beltsville, MD 20705-5139, United States


Since 1998, Peter Bretting has been the USDA–ARS Senior National Program Leader for Plant Germplasm and Genomes. He provides expertise in the form of co-leadership, coordination, and direction of USDA–ARS's national program of crop genetic resources (US National Plant Germplasm System), genomics, genetics, bioinformatics, and breeding research conducted at more than 50 locations nationally, with an annual budget of approximately $165 million. Concurrently, he also provides expertise as co-Principal Investigator for the Global Crop Diversity Trust, Bioversity International, and a USDA–ARS joint project to develop GRIN-Global as an international standard information management tool for plant genebanks. He also serves as an *ex officio* member of the USDA National Genetic Resources Advisory Council, and as a member of US government delegations to various FAO forums.

Prior to that, Peter was Research Leader and Coordinator at the USDA–ARS's genebank at Ames, IA, US, and Collaborator-Associate Professor of Agronomy and Botany, Iowa State University, US, providing expertise in the form of leadership and management of one of USDA–ARS National Plant Germplasm System's largest (50,000+ accessions) genebanks, conducting research on crop genetic resource management and crop genetics, and team teaching with Iowa State University and USDA–ARS scientists a graduate level course 'Plant Genetic Resource Management'.

# Andreas Graner


## Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Germany

Correnssstr. 3, D-06466 Seeland OT Gatersleben, Germany


Andreas Graner has a PhD in Plant Genetics from the Technical University of Münich, Germany. He worked as a Postdoctoral Fellow and as a Staff Scientist at the University of Münich and the Federal Centre for Breeding Research on Cultivated Plants before pursuing a career as Senior Scientist (1997) and Head of the Federal *ex situ* Genebank at IPK Gatersleben, Germany (1999), and Professor for Plant Genetic Resources at the University of Halle, Germany (1999). He has been the Managing Director of IPK since 2007. From 2006 to 2008 he chaired the International Barley Sequencing consortium, and was a Scientific Advisory Board Member for Biodiversity and Genetic Resources for the Federal Ministry for Food and Agriculture.

As a molecular geneticist Andreas has been involved in the development of genomics resources and deployment of molecular tools for crop plant genetics and breeding for over 30 years. Being responsible for the Federal *ex situ* Genebank of Germany, which represents the largest collection within EU 28, he has been deeply involved in collection management improvement, the successful advancement of cereals genomics, and more recently in the application of phenomics to cereals. Furthermore, he is highly active in the establishment of Biodiversity Informatics at the IPK, which involves the convergence of classical genebank documentation with Bioinformatics, and entails the development of data analysis and visualization software tools for the development, management and curation of PGR related databases (including the EURISCO search catalogue for PGR).

Andreas is convinced that promotion of the international effort launched by DivSeek will create and strengthen the research community, and help to build an infrastructure for systematically capturing and storing genomics and phenomics data to be converted into high value information, which provides informed access to PGR for research and breeding.


# Scott A Jackson

**University of Georgia, USA**

Center for Applied Genetic Technologies, 111 Riverbend Road, Athens, GA 30602-6810, United States


Scott A Jackson has a MS (1996) and PhD (1999) in Plant Breeding and Plant Genetics from the University of Wisconsin-Madison, US. He was a postdoc at the University of Minnesota, US, before starting as a Faculty Member at Purdue University, US (2001). In 2011, he joined the University of Georgia, US as a Georgia Research Alliance Eminent Scholar and Professor of Crop Functional Genomics. His research focuses on the application of genomic and cytogenetic tools to understand the structure and function of crop genomes and for the utilization of genetic diversity. Most of his research is on legume crops but he also works on rice.


# Dyno Keatinge

**The World Vegetable Center (AVRDC), Taiwan**

PO Box 42, Shanhua, Tainan 74151, Taiwan


Dyno Keatinge holds a Doctorate in Agriculture from Queen's University, Belfast, UK, and is Visiting Professor of Tropical Agriculture at The University of Reading, UK. He has global expertise in crop agronomy and has worked at a range of international agricultural research centers: ICARDA (Syria), IITA (Nigeria) and ICRISAT (India). Presently, he is Director General of The World Vegetable Center based in Taiwan. He is Chair of the Association of International Research and Development Centers for Agriculture (AIRCA), Chair of the Global Horticulture Initiative and he is on the Advisory Committee to the USAID Innovation Lab. for Horticulture.

His driving concern is to encourage people to consume a sufficient but better balanced diet. Abolishing malnutrition is his principal goal. This implies not only vitamin and mineral deficiency problems but also imbalanced nutrition from excess carbohydrate and fat consumption, which is causing obesity and now commonly serious human diseases such as type II diabetes and metabolic syndrome. AVRDC seeks to bring 'Prosperity to the Poor and Health for All.'


# Carolyn J Lawrence

**Iowa State University, USA**

Departments of Genetics, Development & Cell Biology, and Agronomy, 1035B Roy J Carver Co-Laboratory, Iowa State University, Ames, IA 50011, United States


Carolyn Lawrence is an Associate Professor at Iowa State University (ISU). She led the US Department of Agriculture's maize model organism database MaizeGDB for ten years prior to joining ISU. Dr Lawrence's group develops computational systems and tools that enable researchers to leverage plant genetics and genomics information to better understand basic biology as well as to engineer improved plants. Her group is interested in the application of technologies to predict plant phenotypes, and coordinates activities to connect more traditional phenotypic and genotypic information with data produced using emergent high-throughput phenotyping techniques. Although work by group members is not specifically limited to maize, it is by far their favorite model system.


# Emily Marden

**University of British Columbia, Canada**

School of Law, Allard Hall, 1822 East Mall, Vancouver, British Columbia V6T 1Z1, Canada


Emily Marden is a practicing attorney and Research Associate in the School of Law at the University of British Columbia (UBC), Canada. Her expertise is in governance related to genomics and agriculture. Emily has extensive experience addressing issues of intellectual property (IP), innovation policy and regulatory strategy in the biotechnology and agricultural arenas for public sector, government and the private sector stakeholders. In recent years, she has been working with the Rieseberg laboratory at UBC to address the impact of regulatory, IP and sharing mechanisms on research and innovation. Emily completed her undergraduate degree in molecular biology has graduate degrees in the History and Philosophy of Science, and Law.

# David Marshall

**James Hutton Institute, UK**

Invergowrie, Dundee, DD2 5DA, UK

David Marshall has recently stepped down from leadership of the Information and Computational Sciences Group at the James Hutton Institute, UK. With a first degree in Botany and a PhD in Plant Population Genetics, his research career of over 30 years has focused on the development and deployment of molecular markers in plant genetics and breeding applications. His involvement with the international plant genetic resources community began during his tenure in the Genetics Department at the University of Birmingham, UK. His current research interests are built on the new opportunities for germplasm characterization that have arisen from advances in sequencing and genotyping technologies. His research group has an international reputation for the development of software tools, which have enabled the facile exploration of complex molecular datasets. He plays a significant role in a number of international advisory boards and expert groups.


# Sean Mayes

**Crops for the Future (CFF), University of Nottingham, Malaysia Campus, Malaysia**

Jalan Broga, 43500 Semenyih Selangor Darul Ehsan, Malaysia


Following his BA in Natural Sciences (Genetics) at the University of Cambridge, UK, and a PhD on the 'Genetic improvement of oil palm' while working at Unilever in Cambridge, UK, Sean Mayes became a group leader in the University of Cambridge's Department of Genetics. In 2004, he was appointed as lecturer in Crop Genetics at the University of Nottingham, UK, and became an Associate Professor in 2008. In 2012, Sean joined Crops for the Future (CFF) as a Theme Leader (Biotechnology and Crop Genetics) with responsibility for the BamYIELD program, developing Bambara groundnut as an exemplar legume, and Theme Leader for Biotechnology and Crop Genetics, with a particular focus on data translation from major crop species and model plants through to minor or under-utilized species – the major remit of CFF – and climate resilient crops.

Sean's background is in the practical application of quantitative and molecular crop genetics and he has carried out research on more than a dozen crop species, but particularly oil palm, wheat and Bambara groundnut. During much of his period at Nottingham, he worked closely with Dr Andrzej Kilian at Diversity Arrays Technology Pty Ltd, establishing DArT Genotype-by-Sequencing systems for oil palm and Bambara groundnut and utilizing a number of others.

Sean believes that DivSeek has the potential to make major progress through integration of work on the major crop species, but that it must also address the issues of translation, leveraging the development of new crops and a more diverse and resilient agriculture in those regions where it is appropriate and particularly for low input agriculture. His focus would be to ensure that DivSeek does not simply intensify the research effort being made on major crops, but that it also has a clear focus on the translation from major to minor crops, to complement developments in major crops.


## Kevin Pixley

**International Maize and Wheat Improvement Center (CIMMYT), Mexico**

Km 45, Carretera Mexico–Veracruz, El Batán, Texcoco. Edo de Mexico, CP 56130 Mexico


Kevin Pixley has a BS in Agronomy from Purdue University, US, an MSc in Crop Physiology from the University of Florida, US, and a PhD in Plant Breeding from Iowa State University, US (1990). Immediately after he began working at CIMMYT as a Postdoctoral Fellow, and later worked as a maize breeder, moving to the Center's Harare, Zimbabwe, research station in 1993 and serving as team leader there as of 1997. After 11 years in Africa, he returned to CIMMYT headquarters in Mexico to serve in directing positions in the Global Maize Program. He is currently Director of CIMMYT's Genetic Resources Program and leads the Seeds of Discovery project, which is developing an open access platform of genomic and phenotypic databases along with informatics tools to facilitate the use of maize and wheat biodiversity in applied research and breeding programs. His accomplishments include the development of disease resistant and nutritionally enhanced maize varieties.

# Reno Pontarello


**Genome Prairie, Canada**

101–111 Research Drive, Saskatoon, SK S7N 3R2, Canada


Reno Pontarollo assumed the role of President and CEO of Genome Prairie in April 2013 after serving as the organization's Chief Scientific Officer for seven years. In his current role he is responsible for the overall corporate strategy and vision of the organization. He has a successful track record in government relations, international partnerships, and developing large-scale applied research and development and commercialization projects. Reno has a strong background in agriculture, genomics and immunology in academia and industry.

As the CSO of Genome Prairie, Reno was responsible for oversight of all Genome Prairie-led large-scale projects in agriculture, human health, and natural resources. These projects included the University of Saskatchewan's 'Canadian Triticum Advancement through Genomics' project, which is Canada's contribution to sequencing the wheat genome. Other projects of note in crop genomics include multi-national initiatives in flax, canola, camelina, and carinata, encompassing topics in abiotic stress, seed development, yield, and rhizosphere metagenomics.

Prior to joining Genome Prairie, Reno held positions at Pyxis Genomics and the Vaccine and Infectious Disease Organization (VIDO) in Saskatoon, Canada, and the Defense Research Establishment Suffield near Medicine Hat, Alberta, Canada. Reno is an Adjunct Professor with the Department of Animal and Poultry Science at the University of Saskatchewan.


## Ruaraidh Sackville Hamilton,

**International Rice Research Institute (IRRI),**

**Philippines**

Los Baños, Philippines


Ruaraidh Sackville Hamilton graduated in 1975 with a BA in Natural Sciences from the University of Cambridge, UK, majoring in plant genetic resources, plant breeding and plant ecology. In 1980 he was awarded a PhD, also from the University of Cambridge, on genetic diversity in a native forage legume species. Between 1980 and 2002 he worked mainly in Colombia, Wales and Italy on many aspects of plant genetic resources including plant breeding, genetics, ecology, statistics and database design. In 2002 he was appointed Head of the TT Chang Genetic Resources Centre (GRC) in the International Rice Research Institute in the Philippines, in which capacity he is responsible for managing the international rice genebank and the associated research on genetic diversity and bioinformatics, including the International Rice Informatics Consortium, one of the ‘teeth’ of the DivSeek ‘comb’. He has also taken a leading role in developing institutional policies and protocols in IRRI that ensure not only compliance with the Treaty and but also a complete and effective value chain from genebank through breeder and farmer to consumer.


# German Spangenberg

**Victorian Department of Environment and Primary Industries, Australia**

Horsham, Victoria 3401, Australia


German Spangenberg has a MSc from the University of Uruguay, a PhD from the University of Heidelberg and Max-Planck-Institute Germany, and a DSc in Agri-Biotechnology from the Swiss Federal Institute of Technology (ETH), Zürich, Switzerland. He was elected Fellow of the Australian Academy of Technological Sciences and Engineering in 2007 and was the recipient of the Australian Thinker of Year 2006 Award.

German is Executive Director of the Biosciences Research Division of Department of Economic Development, Jobs, Transport and Resources (DEDJTR), Victoria, Australia; Professor (Plant Genetics and Genomics) and Head of School of Applied Systems Biology with La Trobe University, Australia; and Director of AgriBio (DEDJTR), the Centre for AgriBioscience, Australia. German leads 380 staff and students with expertise in biotechnology, molecular genetics, molecular phenomics, computational biology, microbial sciences, plant functional genomics, molecular plant breeding, plant phenomics and genetic resource management. This group is leading the way in the use of modern technology for the future development of sustainable agricultural crops.


# Björn Usadel

**Forschungszentrum Jülich, Germany**

Wilhelm Johnen Str, 52428 Jülich, Germany


Björn Usadel currently leads the Cell Wall and Bioinformatics Group at the Plant Science institute (IBG-2) at Forschungszentrum Jülich where he serves as a Director. In addition, he is a full Professor and Head of the Institute of Botany at RWTH Aachen University, Germany. His interests are in the analysis and annotation of plant genomes and transcriptomes, focusing on functional annotation and bridging these data to phenotyping approaches. Presently, he is investigating wild crop relatives as well as land races and medicinal plants.

After having worked in New York on Drosophila, he obtained his doctorate on cell wall research in the laboratory of Markus Pauly. He then worked in the lab of Prof Mark Stitt on transcriptomics data visualization and interpretation in Potsdam-Golm, Germany, where he further developed the tool MapMan. Since then, he has released many open source tools for the analysis and interpretation of plant data. His motivation is to make data free, shareable and usable using ontologies, to unlock big data in plant science to improve the usability and productivity of plants.


# Rajeev Varshney

**International Crop Research Institute for Semi Arid Topics (ICRISAT), India**

Patancheru, 502 324, India


Rajeev Varshney, an Indian national and Principal Scientist, is serving ICRISAT as a Research Program Director, Grain Legumes, and Director of the Center of Excellence in Genomics (CEG). He is also Winthrop Research Professor at the University of Western Australia. In his dual appointment, Rajeev previously served the CGIAR Generation Challenge Program based in Mexico as Theme Leader for six years. Before joining ICRISAT, he worked at Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Germany for five years. Rajeev has a basic background in molecular genetics and possess about 20 years research experience in international agriculture.

Rajeev's primary contributions include genome sequencing of pigeonpea, chickpea, peanut, pearl millet, sesame, mung bean and adzuki bean. He also led the development of the first generation of molecular breeding products in chickpea and groundnut along with large-scale genomic resources like molecular markers, transcriptome assemblies, high-density genetic maps and QTLs for a range of traits in legumes. Rajeev has been the pioneer in the field of sequencing and re-sequencing and has been advocating the use of next generation sequencing technology to understand the genetic architecture of germplasm.

Rajeev has a prolific publication record with an *h*-index of 51 and >250 publications in leading journals of international reputes including *Nature*, *Nature Biotechnology*, *Nature Communications*, *PNAS* and others; ten edited books; and Special Issues (as Guest Editor) for several journals to his credit. He is frequently invited to speak at national and international conferences; past speaking engagements include the G-8 Conference on 'Open Data for Agriculture', the FAO conference on 'Application of Biotechnologies in Developing Countries', and a brainstorming session on digital agriculture chaired by Bill Gates. Rajeev has won several awards/fellowships including Elected Fellow of Indian National Science Academy (INSA), National Academy of Agricultural Sciences (NAAS), India; Crop Science Young Scientist Award (Crop Science Society of America); INSA Young Scientist Medal; Associate NAAS Fellow; NASI Young Scientist Platinum Jubilee Award, and Illumina's Greater Good Initiative Award.


# Steve Visscher

**Biotechnology and Biological Sciences Research Council (BBSRC), UK**

Polaris House, Swindon, SN2 1UH, UK


Since 1994 Steve has worked for the BBSRC, the UK's leading research-funding agency for the biosciences, including agriculture and food security. Initially he served as Director of Finance and subsequently has undertaken a variety of roles, including BBSRC Interim Chief Executive for one year, Deputy Chief Executive and Chief Operating Officer and now Deputy Chief Executive – International. His current position includes international relations alongside other strategic initiatives such as development of UK Research and Innovation campuses.

Steve has been closely involved with national research policy developments, in moves to establish a sustainable science base, shared research infrastructures, major partnerships between institutes and universities. In recent years his focus has been on developing partnerships between international funding agencies and foundations. He chaired the founding group of the International Wheat Yield Partnership and now serves as its Deputy Chair and also chairs the G20 initiated Wheat Initiative Institutions' Committee. He is also a Director of the Norwich Research Park research and innovation campus and a Trustee of the Medical Research Foundation charity.

Steve is a Fellow of the Society of Biology and was awarded a CBE for services to the support of scientific research in the British New Year Honours for 2013.

# List of nominated candidates for the DivSeek Steering Committee Election

**Michael Abberton** - International Institute of Tropical Agriculture (IITA), Nigeria

**Elizabeth Arnaud** - Bioversity International, France

**Sarah Ayling** - The Genome Analysis Centre (TGAC), UK

**James Bradeen** - University of Minnesota, USA

**Peter Bretting** - US Department of Agriculture–Agricultural Research Service (USDA–ARS), USA

**Andreas Graner** - Leibniz Institute of Plant Genetics and Crop Plant Research (IPK),

**Scott Jackson** - University of Georgia, USA

**Dyno Keatinge** - The World Vegetable Center (AVRDC), Taiwan

**Carolyn Lawrence** - Iowa State University, USA

**Emily Marden** - University of British Columbia, Canada

**David Marshall** - James Hutton Institute, UK

**Sean Mayes -** Crops for the Future (CFF), Malaysia

**Kevin Pixley** - International Maize and Wheat Improvement Center (CIMMYT), Mexico

**Reno Pontarollo** - Genome Prairie, Canada

**Ruaraidh Sackville-Hamilton** - International Rice Research Institute (IRRI), Philippines

**German Spangenberg** - Victorian Department of Environment and Primary Industries, Australia

**Björn Usadel** - Forschungszentrum Jülich, Germany

**Rajeev Varshney** – International Crop Research Institute for Semi Arid Topics (ICRISAT), India

**Steve Visscher** - Biotechnology and Biological Sciences Research Council (BBSRC), UK

# DIVSEEK Charter

This Charter defines the general conditions for the operation of DIVSEEK and sets forth the governance structure for voluntary cooperation by Partners. This Charter does not create any legally binding obligation between or among Partners.

The DIVSEEK First Assembly approved this Charter on 9 January 2015 in San Diego (USA). The list of organizations represented at the Assembly is in the Annex.

## Background

Meeting the food needs of a growing human population in an era characterized by climate change and increased competition for land and water is a key global challenge. Crop production must rise, and crops must become more resilient to an increasingly unstable climate to produce sufficient nutritious food and other agricultural products in a sustainable manner. Natural variation from genetic resources is the raw material for crop improvement, and thus must be a critical component of any comprehensive strategy to address food security and the sustainability of agricultural production.

Game-changing technologies and advanced data processing and analysis capabilities now enable a more comprehensive approach to genetic resources, using existing but dispersed capacities of genebanks, breeders, researchers, farmers and other stakeholders, to respond to global research priorities. In recent years a number of crop-specific projects have been initiated in this new sphere. In an attempt to link these efforts DivSeek was initiated, as a voluntary association of like-minded partners harnessing genetic resources for food security to create synergies that would benefit most stakeholders and hence accelerate the unlocking of the value of genetic resources for the benefit of sustainable intensification and climate proofing of global agriculture.

## Mission

The mission of DIVSEEK is to cross-link, support and add value to individual activities that **harness the power of crop diversity** for food and nutritional security and societal and economic benefits, by enabling breeders and researchers to mobilize genetic variation in order to **accelerate crop improvement**.

## Principles

DIVSEEK aims to bring together a broad array of voluntary partners to **facilitate networking** among otherwise disconnected efforts to harness genetic resources for crop improvement and to ensure the continuous relevance of their outputs for the targeted beneficiaries. DIVSEEK is a **community-driven** and **inclusive** initiative open to all institutions from all relevant sectors, including public, private, academic, civil society and intergovernmental organizations. Any organization can become a Partner by accepting this Charter in writing.[1]

DIVSEEK advocates the application of state-of-the-art genomic, phenotyping and bioinformatics technologies to enhance the quality, efficiency, and cost-effectiveness of germplasm conservation, provision and utilization for breeding, to **deepen our understanding of crop diversity** and to stimulate public interest in the role of genetic diversity for crop improvement.

DIVSEEK facilitates the **linking of germplasm with passport, characterization and evaluation data** through formulating and advocating common data and informatics standards and best practices designed to enable interoperability among information systems, to broaden the usability of data and germplasm, and to support open access to germplasm-associated data. DIVSEEK advocates and promotes the widespread adoption of terms and guidelines for access and use of data and knowledge about plant genetic resources.

DIVSEEK follows a **modular approach** to information management which aims to define and maintain a set of core standards for data exchange to enable data integration and interoperability among continuously evolving and potentially diverse platforms and data domains. This approach reduces transaction costs, allows for effective 'rights management' at a level of discretion determined by individual stakeholders, and allows stakeholders to absorb and adapt to new requirements and rapidly changing technologies.

DIVSEEK contributes to on-going international cooperation for the developing and strengthening of a **global information system**, to facilitate the exchange of information on scientific, technical and environmental matters related to plant genetic resources for food and agriculture.

DIVSEEK recognizes the importance of **understanding the needs and capacities** of stakeholders such as genebanks, breeders, researchers and farmers to define priority areas for germplasm characterization and evaluation, and data access. DIVSEEK identifies and communicates critical needs and facilitating cross-crop learning and capacity development and training to access and apply cutting-edge tools for the analysis and knowledge transfer from genotypic and phenotypic data on plant genetic resources, for impact-oriented and discovery-driven research.

To implement the actions and principles set forth in this Charter, DIVSEEK may elaborate operational guidelines, including through **expert consultations**.

[1] At the first DivSeek Assembly, private sector organizations have acted as observers, pending the definition of operational guidelines for their engagement.

## Membership

**Partners** are organizations that support DIVSEEK's mission by voluntarily associating specific activities with DIVSEEK and by providing advice and support. Partners individually determine the nature and extent of their participation in DIVSEEK.

New organizations that wish to join as Partner may submit a letter of interest to the Joint Facilitation Unit and, upon invitation by the Steering Committee, be asked to approve this Charter in writing.

## Governance

All Partners are invited to nominate one representative and one alternate to participate in the annual DIVSEEK **Assembly**. The Assembly meets at least once a year. The functions of the Assembly are to:

a) Consider and approve DIVSEEK's annual work plan and the budget of the Joint Facilitation Unit, accompanied by a resource mobilization plan, and the annual progress report, submitted by the Steering Committee;
b) Recommend the strategic direction of activities and projects associated with DIVSEEK;
c) Elect the Steering Committee members from among Partners, for a term of two years, renewable for one term[2]; and
d) Elect a Chairperson of the Assembly, for a term of two years, renewable for one term.

The **Steering Committee** consists of the Chairperson of the Assembly and eight Partner representatives, preferably from different regions, types of organizations and categories of expertise. The Steering Committee convenes at least twice a year. Representational guidelines for the Steering Committee may be defined by the Assembly. The functions of the Steering Committee are to:

a) Prepare the agenda for the Assembly;
b) Provide inputs and eventually endorse the draft DIVSEEK's annual work plan and the draft budget of the Joint Facilitation Unit, accompanied by a resource mobilization plan, and the annual progress report;
c) Periodically collect information about interactions among Partners and convey such information to the Assembly;
d) Advise the Assembly on the strategic direction of activities and projects associated with DIVSEEK; and
e) Work with the Joint Facilitation Unit to prepare and present information and updates on DIVSEEK for the constituencies and governing bodies of the institutions providing the Joint Facilitation Unit.[3]

The Assembly and the Steering Committee shall make every effort to adopt their decisions by consensus, that is, the absence of a formal objection by any of the Partners present at the

[2] The first Steering Committee will have staggered appointments; half of the members will be appointed for one year, half for two years; all will be eligible for a second term of two years.

[3] The Global Crop Diversity Trust, the CGIAR Consortium Office, the Global Plant Council and the Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture provide the Joint Facilitation Unit. Voluntary cooperation on DIVSEEK does not necessarily entail any obligation in relation to the International Treaty on Plant Genetic Resources for Food and Agriculture.

meeting. A valid quorum for meetings of the Assembly is the presence of the majority of the Partners. Changes to this Charter shall only be possible with the consensus of the Assembly, with at least three quarters of the Partners present.

The Assembly and the Steering Committee may establish rules of procedure for their meetings. Such rules of procedures may provide for matters such as: a) notice and record of meetings; b) decision making (e.g., where consensus cannot be reached) and recording of dissent; c) electronic tools and procedures for decision making; d) conflict of interest; e) replacement of Steering Committee members.

The functions of the **Joint Facilitation Unit** are to:

a) Develop the draft DIVSEEK's annual work plan and the draft budget of the Joint Facilitation Unit, accompanied by a resource mobilization plan, and the annual progress report;
b) Develop initiatives for awareness raising, capacity development and training;
c) Support the development of operational guidelines to implement DIVSEEK's principles;
d) Provide potential Partners with membership information, and engage in recruitment and capacity building to help ensure the widest range of participation in DIVSEEK;
e) Promote linkages for DIVSEEK to cooperate with other initiatives and programs of relevance to its mission, such as the CGIAR Research Programs and multilateral initiatives promoting access to, and transfer of technology and knowledge;
f) Assist the Steering Committee in the periodical collecting of information about interactions among Partners;
g) Prepare meetings of the Assembly and the Steering Committee; and
h) Jointly mobilize financial and other resources for DIVSEEK's work plan and administer the budget of the Joint Facilitation Unit.

## Use of logos and names

Partners may, on a good-faith basis, use DIVSEEK's logo and name for DIVSEEK's activities. Partners understand that, subject to their agreement, their names and logos may be displayed on DIVSEEK's web site and documentation.

## Withdrawal

Partners wishing to withdraw from DIVSEEK should provide written notice to the Joint Facilitation Unit, preferably two months in advance. Upon withdrawal, the Partner is to cease associating any of its projects and partnerships being executed as a result of participation in DIVSEEK with DIVSEEK's initiative and logo.

**Annex to the Charter**

**List of DivSeek Partners**

| | | |
|---|---|---|
| AAFC | Agriculture and Agri-Food Canada | Canada |
| ACPFG | Australian Centre for Plant Functional Genomics | Australia |
| ANU | Australian National University | Australia |
| APPF | Australian Plant Phenomics Facility | Australia |
| AVRDC | The World Vegetable Center | Taiwan Province of China |
| BBSRC | Biotechnology and Biological Sciences Research Council | UK |
| BECA | Biosciences Eastern and Central Africa | Kenya |
| BGI | Beijing Genomics Institute | China |
| Bioversity | Bioversity International | Italy |
| BLE | Federal Office for Agriculture and Food | Germany |
| CATIE | Center for Tropical Agriculture Research and Education | Costa Rica |
| CFF | Crops for the Future | Malaysia |
| CGIAR CO | CGIAR Consortium Office | France |
| CIMMYT | International Maize and Wheat Improvement Center | Mexico |
| CIP | International Potato Center | Peru |
| CIRAD | Agricultural Research Centre for International Development | France |
| Clemson Univ. | Clemson University | USA |
| Cornell Univ. | Cornell University | USA |
| CRA | Agricultural Research Council | Italy |
| cROP | Common Reference Ontologies for Plant Biology | USA |
| Dalhousie Univ. | Dalhousie University | Canada |
| EBI | European Bioinformatics Institute | UK |
| EMBRAPA | Brazilian Corporation of Agricultural Research | Brazil |
| FZJ | Research Centre Jülich | Germany |
| GCDT | Global Crop Diversity Trust | Germany |
| Genome BC | Genome British Colombia | Canada |
| Genome Canada | Genome Canada | Canada |
| Genome Prairie | Genome Prairie | Canada |
| GPC | Global Plant Council | UK |
| IBBR-CNR | Institute of Biosciences and Bioresources, National Research Council | Italy |
| ICARDA | International Center for Agricultural Research in the Dry Areas | Syria |
| ICBA | International Center for Biosaline Agriculture | UAE |
| ICRAF | World Agroforestry Centre | Kenya |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics | India |

| | | |
|---|---|---|
| IITA | International Institute of Tropical Agriculture | Nigeria |
| INRA | National Institute for Agricultural Research | France |
| IPK | Leibniz Institute of Plant Genetics and Crop Plant Research | Germany |
| iPlant | iPlant | USA |
| IRRI | International Rice Research Institute | Philippines |
| ISU | Iowa State University | USA |
| ITPGRFA | Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture | |
| JHI | James Hutton Institute | UK |
| NIAS | National Institute of Agrobiological Sciences | Japan |
| NIG | National Institute of Genetics | Japan |
| NordGen | Nordic Genetic Resource Center | Sweden |
| QAAFI | Queensland Alliance for Agriculture and Food Innovation | Australia |
| TGAC | The Genome Analysis Centre | UK |
| UBC | University of British Columbia | Canada |
| UC Davis | University of California, Davis | USA |
| UGA | University of Georgia | USA |
| UMN | University of Minnesota | USA |
| UM | University of Missouri | USA |
| USASK | University of Saskatchewan | Canada |
| USDA-ARS | United States Department of Agriculture - Agricultural Research Service | USA |
| VicDEPI | Victorian Department of Environment and Primary Industries | Australia |
| Wageningen UR | Wageningen University – Plant Breeding | The Netherlands |