

# CONNECTIONS

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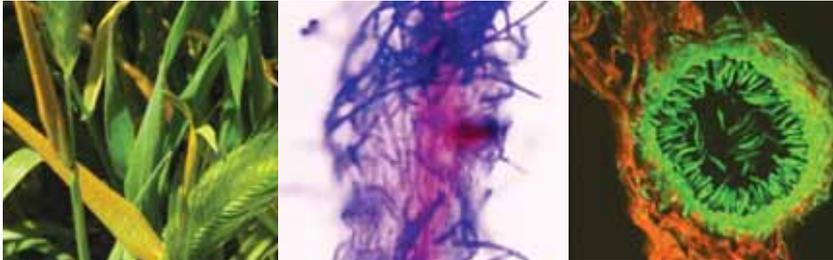


Photo acknowledgements: Narayana Upadhyaya, CSIRO Plant Industry, Karam Singh, CSIRO Plant Industry, Kasia Rybak, Australian Centre for Necrotrophic Fungal Pathogens

## GROWING MOMENTUM ON WHEAT PATHOGEN DATASETS

Bioplatforms Australia's wheat dataset initiative has attracted wide support from wheat researchers and industry partners since it was kicked off at the end of 2010.

Industry collaboration is a crucial element of Bioplatforms Australia's dataset initiatives and an effective way to leverage the world class knowledge and expertise resident in Australia. Most importantly, it ensures that the datasets will be relevant and beneficial not only to researchers but industry stakeholders as well.

Since the outset of the project, Bioplatforms Australia established a consortium of leading researchers with the expertise to both contribute data and guide the direction of the project. This collaborative approach is paying off and excellent progress has been made in creating genomic data for the wheat varieties considered most important to Australia, as well as the complimentary data sought for wheat pathogens.

To take stock of progress, contributors involved in the wheat pathogen elements of the research program met in Perth last February to discuss data created by Bioplatforms Australia and set directions for future work. With the welcome leadership of Dr John Manners (Deputy Chief, CSIRO Plant Industry), the pathogenomics group identified a diverse range of wheat fungal pathogens for future efforts. The list included pathogens causing stripe rust, stem rust,

tan spot, glume blotch, septoria leaf blotch, crown rot/head blight as well as the Russian wheat aphid. Dataset collaborators will generate new genome, transcript, proteome and metabolome data which will be compiled with other datasets generated for the Wheat Dataset project.

The February meeting also included a mix of researchers who have been working on the wheat sequencing program so that both pathogen and sequencing collaborators could participate in a data sharing workshop and discuss various project challenges. The 60 researchers that participated were representatives of various plant pathology labs, Bioplatforms Australia facilities and a number of universities including Curtin, ANU, Murdoch, Sydney and Charles Sturt.

Progress on the wheat project has been very pleasing to date. Almost half the genome datasets for the fungal pathogens have been generated and significant inroads have been made on the protein profiling component. The Perth meeting enabled fruitful discussion on the remaining work to be completed, particularly the transcript, proteome and metabolome goals together with the bioinformatics support required to ensure that the data and associated metadata are both accessible and relevant.

A follow up meeting with a smaller working group will occur in the coming months and will focus on co-ordinating the analysis required for the extensive array of data created.

Please contact Anna Fitzgerald at Bioplatforms Australia for further information: [afitzgerald@bioplatforms.com](mailto:afitzgerald@bioplatforms.com)

## SOIL SAMPLES COLLECTED FOR BIOPATFORMS SOIL INITIATIVE

The BASE (Biome of Australian Soils) dataset project led by Bioplatforms Australia is now underway after extensive consultation and planning.

The project aims to provide baseline measurements of microbial biodiversity in soils across the Australian continent using genomic sequencing approaches.

Dr Frank Reith, a researcher from the University of Adelaide, has collected the first samples in a mammoth road trip through central and west Australia. Reith, interested in understanding biogeochemical cycling of gold and the role microbes have in the process, is making an invaluable contribution to the BASE project.

Over a 5 week period, Reith and his team travelled 13,000km to collect samples for analysis. The team started in South Australia and travelled north through the heart of Australia (see map). After hitting the north west coast, the return journey went southward through Western Australia.

A four wheel drive loaded with three people and two fridge-freezers enabled efficient collection of soil samples and other environmental data from around 80 sites. Selected sites were diverse and included salt lakes, mining exploration sites, sand dune environments, banded iron formations and areas between opals fields. Reith's team used both geological and vegetation maps in conjunction



Lake Hart, Woomera SA



To promote data sharing and reuse of growing data resources, Bioplatforms Australia is collaborating with a research team from the University of Oxford



FRANK REITH AND HIS TEAM TRAVELLED 13,000KM THROUGH CENTRAL AND WEST AUSTRALIA

with visual observations to select characteristic landscapes.

While significant, Reiths' samples represent only a fraction of the sites that will be included in the BASE project. Genomic analysis will be performed on samples from several hundred sites collected by other project collaborators such as CSIRO, National Parks, State Departments of Primary Industry, the GRDC, and universities.

All soil samples collected as part of the BASE project will contribute to a 'soil map' which has significant potential to inform land management, site remediation and conservation efforts. Bioplatforms Australia's genomics partners are performing all of the DNA extraction and sequencing work. At the completion of the project, the sequence data and associated contextual information for each site will be made accessible to all Australian scientists as part of Bioplatforms Australia's dataset program.

## BIOPLATFORMS AUSTRALIA PROMOTES DATA COMMONING

Bioplatforms Australia's framework dataset program has instigated new initiatives to facilitate data sharing.

Complexities in managing and integrating diverse datasets for scientific analysis remains a persistent barrier for the scientific community. Unlocking the benefits of large datasets being generated by Bioplatforms Australia and others relies on the integration of data from a whole range of 'omic technologies spanning from next-generation sequencing to mass spectrometry. Likewise, integrating Australian datasets with other valuable data repositories from around the world can be problematic as not all experimental and contextual data is captured and described in a standardised way.

To promote data sharing and reuse of growing data resources, Bioplatforms Australia is collaborating with a research team from the University of Oxford that has developed an open source software suite for managing omic' studies. The team has developed a framework called ISA-tab built around the contextual data associated with the 'Investigation', 'Study' and 'Assay' (ISA). The aim is to make omic' datasets comprehensible through standardised metadata capture which will allow data sharing and broader accessibility within the international community.

Bioplatforms Australia has now adopted the ISA-tab format for all its framework dataset projects and will make curated data assessable through a web-portal based on a local storage system known

as BioInvestigation Index (BII), also developed by the Oxford ISAtools team.

To support international efforts towards greater data harmonisation, Bioplatforms Australia has joined with 30 academic and commercial organisations from around the world to agree on a standard way of describing data sets based on the ISA-framework. This data sharing initiative and the communities involved is described in the article *Toward interoperable bioscience data* published in the prestigious journal Nature Genetics.

To further promote harmonisation within the Australian scientific community, Bioplatforms Australia and the CSIRO sponsored the Oxford ISAtools developers, Dr Philippe Rocca-Serra and Eamonn Maguire to meet with research teams around Australia and run a series of ISAtools training courses. The courses, held in Brisbane, Perth and Canberra, aimed to promote and facilitate an ISA commons data-sharing community in Australia.

## ENGAGING YOUTH IN SCIENCE REQUIRES NEW COMMUNICATION STRATEGIES

Bioplatforms Australia attended the Australian Science Communicators National Conference held in Sydney from 27 to 29 February.

The Conference was sponsored by the Department of Industry Innovation, Science, Research and Tertiary Education and provided participants with a unique opportunity to meet with science communicators from around the nation to discuss, promote and learn about science communication.

The keynote address by Australia's Chief Scientist, Professor Ian Chubb drew attention to the growing need for science to be better communicated to the public and the importance of creating a scientifically literate community.

Professor Chubb spoke of the alarming decline in the number of Australian students studying mathematics, engineering and science at secondary school and university. To counteract this decline, he believes that it is essential for all scientists and science communicators to actively interact with the community to explain the importance of their research and to attract young inquiring minds to science, mathematics and technology disciplines. In line with this theme, the use of sophisticated social media such as Facebook, twitter and online blogs to interact directly with web savvy youth and appeal to a younger audience were demonstrated.

Overall the conference delivered a clear message: Everyone involved in Australian science must play a role to promote science and its benefits by actively engaging the public through better communication strategies. This can occur with traditional media, however, many new ways of communicating are available and the web and other digital methods should receive greater attention in this modern age.



You can now keep up to date with Bioplatforms Australia activities on twitter @Bioplatforms Aus.

## BPA BIOINFORMATICS TRAINING INITIATIVE

To support Australian life scientists undertaking systems biology research, Bioplatforms Australia is collaborating with the European Bioinformatic Institute (EBI), a member of the European Molecular Biology Laboratory (EMBL) to provide a program of bioinformatics workshops in genomics, proteomics and metabolomics.



### ATTENDEES AT EMBL-EBI

Nandan Deshpande, Nathan Watson-Haigh, Catherine Shang, Sonika Tyagi, Konsta Duesing, Sean McWilliams, Li Xi. Absent: Paula Moolhuijzen.

The first course was a two day hands-on Next Generation Sequencing workshop run at a number of national locations.

In March, a team of eight Australian bioinformaticians from The Australian Bioinformatics Network (ABN), a national initiative supported by Bioplatforms Australia, EMBL-Australia, and CSIRO, visited the EMBL-EBI at the Wellcome Trust Genome Campus in Hinxton near Cambridge. The group received six days of intensive training and commenced planning the first workshops to be held in Australia. They also participated in and observed the running of an EBI-EMBL Next Generation Workshop.

The ABN bioinformatics trainers all have extensive experience in the field of genomics and are committed to providing world-class bioinformatics training for the benefit of Australian life scientists. Trainers include Dr Nandan Deshpande (UNSW Systems Biology Initiative, Sydney), Dr Konsta Duesing (CSIRO, North Ryde), Dr Xi Li (CSIRO, Bioinformatic Core, Canberra), Dr Sean McWilliams (CSIRO, Livestock Industries, Brisbane), Dr Paula Moolhuijzen (Centre for Comparative Genomics, Perth) Dr Catherine Shang (Bioplatforms Australia, Sydney), Dr Sonika Tyagi (AGRF, Melbourne) and Dr Nathan Watson-Haigh (Australia Wine Research Institute, Adelaide).

Bioplatforms Australia's first ever bioinformatics workshop on Next

Generation Sequencing covered quality control, alignment, RNASeq analysis, ChIP-Seq analysis and de novo gene assembly with emphasis on computational exercises and was very well received by participants. The course was designed for researchers with little or no experience in Next Generation Sequencing analysis or bioinformatics and aimed to familiarise researchers with commonly used software application and workflows. Further courses will be offered in 2012 and beyond.

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## BIOPLATFORMS AUSTRALIA SHARES FUNDING INSIGHTS WITH NEW ZEALAND GENOMICS LIMITED

Dr Tony Lough, CEO of New Zealand Genomics Limited (NZGL) invited Bioplatforms Australia to contribute to a workshop hosted by NZGL in Hamilton in March 2012.

The workshop aimed to clarify a strategic position for genomics investment in New Zealand and investigate the innovative Framework



## Sue Meek is passionate about promoting awareness and understanding of science and technology

Dataset approach recently initiated by Bioplatforms Australia.

The workshop brought together key stakeholders in New Zealand research and innovation, including senior representatives across the research sector – biomedicine, agriculture, and information technology. Not unlike Australia, New Zealand’s strategic research agenda is dependent upon readily accessible genomics capability which has historically been hampered by the lack of scale that is evident in Europe, North America and more recently Asia. Future investment by NZGL provides an opportunity to address this issue, and lessons learned through the early years of the NCRIS and Super Science programs in Australia were a focus of discussions.

The Framework Data initiative instigated by Bioplatforms Australia was considered to be a useful mechanism for maximising the impact of potential investment directly by building capability that would in turn promote the routine fee-for-service work offered by NZGL.

Bioplatforms Australia and NZGL will continue exchange their experience and share insights of the fast changing world of next generation genomics.



### BIOPLATFORMS AUSTRALIA APPOINTS A NEW DIRECTOR

Bioplatforms Australia is pleased to welcome Dr Sue Meek to its Board of Directors.



SUE MEEK

Besides 25 years of experience in working at the interface of industry, academe and government, Sue is passionate about promoting awareness and understanding of science and technology and formulating policies and programs to stimulate the application of research and development.

Sue was appointed Chief Executive of the Australian Academy of Science in May 2008 and was previously Australia’s inaugural Gene Technology

Regulator. This statutory appointment was established by the Commonwealth Government to administer the national regulatory system for the development and use of genetically modified organisms.

Prior to this, Sue gained pertinent experience through senior State Government positions where she was responsible for the development and implementation of policies on science and technology, public sector intellectual property management and the administration of grant programs to support innovation and develop research capability.

Sue has a PhD in marine biology; an MSc in oceanography; and a BSc (Hons) in microbiology. She is a Fellow of the Australian Institute of Company Directors and of the Australian Academy of Technological Sciences and Engineering, and chairs the Advisory Council of the Washington-based Centre for Environmental Risk Assessment (part of the International Life Sciences Institute Research Foundation).

### NEW WEBSITE

Bioplatforms Australia has launched a new website at [www.bioplatforms.com](http://www.bioplatforms.com)



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