Initiative ID: SR0567379

Total number of sheets contained in this application 19

Information on this form is collected in order to make recommendations to the Minister on the allocation of financial assistance under the Australian Research Council Act 2001 and for post award-reporting. The information collected may be passed to assessors for the purposes of obtaining a peer review assessment of the application. It may also be passed to the National Health and Medical Research Council, the National Occupational Health and Safety Commission, the Department of Foreign Affairs and Trade, the Department of Industry, Tourism and Resources, the Department of the Environment and Heritage, the Department of Education, Science and Training, the Department of Agriculture, Fisheries and Forestry and the Department of Veterans’ Affairs for the purpose of checking eligibility. In other instances, information on this form can be disclosed without your consent where authorised or required by law.

PART A—ADMINISTRATIVE SUMMARY

A1 ORGANISATION TO ADMINISTER GRANT

Name The Australian National University

A2 INITIATIVE TITLE

(Provide a descriptive title of no more than 20 words)

The Australasian Pollen and Spore Atlas

A3 PARTICIPANT SUMMARY

Personnel who will be responsible for the conduct of the initiative.

Notes: Participant details are sought in Part B.

The first named person must be from the administering organisation.

<table>
<thead>
<tr>
<th>Person number</th>
<th>Family name</th>
<th>Initials</th>
<th>Organisation</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Haberle</td>
<td>SG</td>
<td>The Australian National University</td>
<td>CI</td>
</tr>
<tr>
<td>2</td>
<td>Hope</td>
<td>G</td>
<td>The Australian National University</td>
<td>CI</td>
</tr>
<tr>
<td>3</td>
<td>Buchhorn</td>
<td>M</td>
<td>The Australian National University</td>
<td>CI</td>
</tr>
</tbody>
</table>

A4 SUMMARY DESCRIPTIONS

A4.1 INITIATIVE SUMMARY

In no more than 750 characters (approx 100 words) of plain language, summarise aims, significance and expected outcomes.

This proposal will enable online accessibility to the largest collection of pollen and spores information in the Australasian region that is currently located at the Australian National University. This will be a searchable database that is accessible over the web and suitable for professional as well as the technical novice involved in pollen and spore identification. Novel approaches to the federation of other smaller existing pollen and spores databases will result in The Australasian Pollen and Spores Atlas. The Atlas will be a flexible and powerful knowledge management tool applicable to research development by a wide range of users including those within the archaeology, biology, geology, and airborne allergy specialists.
A4.2 Summary of National/Community Benefit (For Publicity Purposes)

In no more than 750 characters (approx 100 words) of plain language, summarise the national/community benefits that are expected to arise from the research.

The results generated in this project will enhance Australian research capabilities across multiple disciplines by providing access to key knowledge of pollen and spores in our region. A unified approach to the archiving, presentation and accessibility to existing and evolving databases will provide a considerably improved context for identification and knowledge pooling of any given pollen or spore type. This will create a nexus for novel interactions between researchers and end users of this data from within and beyond Australia’s borders.

A5 CLASSIFICATIONS AND OTHER STATISTICAL INFORMATION

A5.1 Keywords

<table>
<thead>
<tr>
<th>Pollen</th>
<th>Spores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australasian</td>
<td>digital imaging</td>
</tr>
<tr>
<td>data mining</td>
<td>federated databases</td>
</tr>
</tbody>
</table>

A5.2 Research classifications

<table>
<thead>
<tr>
<th>Research Fields, Courses and Disciplines (RFCD)</th>
<th>%</th>
<th>Socio-Economic Objective (SEO)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>280108</td>
<td>50</td>
<td>780104</td>
<td>40</td>
</tr>
<tr>
<td>260113</td>
<td>25</td>
<td>780107</td>
<td>30</td>
</tr>
<tr>
<td>430207</td>
<td>25</td>
<td>780105</td>
<td>30</td>
</tr>
</tbody>
</table>

A5.3 If the proposed research involves international collaboration, please specify country/ies.

<table>
<thead>
<tr>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
</tr>
<tr>
<td>USA</td>
</tr>
<tr>
<td>PNG</td>
</tr>
<tr>
<td>New Caledonia</td>
</tr>
<tr>
<td>Indonesia</td>
</tr>
<tr>
<td>Fiji</td>
</tr>
<tr>
<td>East Timor</td>
</tr>
</tbody>
</table>

A5.4 National Research Priorities

<table>
<thead>
<tr>
<th>National Research Priority</th>
<th>Priority Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontier Technologies for Building and Transforming Australian Industries</td>
<td>Smart information use</td>
</tr>
</tbody>
</table>

A6 ADDITIONAL DETAILS

A6.1 Have any participants on this application submitted an application with similar aims to any other agency?   Yes ☐  No ☒

If Yes, please provide details.

A6.2 Do you wish this application to be assessed as an initiative of benefit to regional or rural community/ies?   Yes ☐  No ☒
## PART C—INITIATIVE COST

Costs are quoted exclusive of the GST.

### C1 BUDGET DETAILS FOR 2005

<table>
<thead>
<tr>
<th>Column 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of funds</td>
<td>ARC</td>
<td>Admin Org</td>
<td>Industry Partners</td>
<td>Other</td>
<td>Total</td>
<td>Cash</td>
<td>In-kind</td>
</tr>
<tr>
<td>Personnel (Salaries + On-costs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Investigator</td>
<td>0</td>
<td>49720</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>49720</td>
<td></td>
</tr>
<tr>
<td>Technical assistance</td>
<td>12560</td>
<td>12560</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>25120</td>
<td></td>
</tr>
<tr>
<td>Initiative personnel</td>
<td>137048</td>
<td>2720</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>139768</td>
<td></td>
</tr>
<tr>
<td><strong>Total Personnel (a)</strong></td>
<td>149608</td>
<td>65000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>214608</td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workshop activities</td>
<td>14000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14000</td>
<td></td>
</tr>
<tr>
<td>ICT short term visits.</td>
<td>8000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8000</td>
<td></td>
</tr>
<tr>
<td>Post-funding workshop</td>
<td>14000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14000</td>
<td></td>
</tr>
<tr>
<td><strong>Total Travel (b)</strong></td>
<td>36000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>36000</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PC Workstations x2</td>
<td>0</td>
<td>8540</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8540</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Total Other (c)</strong></td>
<td>0</td>
<td>8540</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8540</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL COSTS (d)</strong></td>
<td>185608</td>
<td>73540</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>259148</td>
<td></td>
</tr>
</tbody>
</table>
C2  JUSTIFICATION OF FUNDING REQUESTED FROM THE ARC

PERSONNEL
The personnel to be funded by the e-Research grant will provide the expertise required to achieve the aims of the proposal. The Chief Investigators will all contribute 0.1FTE through the ANU.

Technical assistance: The request for a casual Research Assistant at ANU Level 5 (@$25.12/hr) for 500 hours is to assist in data entry and checking and the curation of the existing pollen and spore collection at ANU. The casual research assistant will have lab and data entry experience. The Department of Archaeology and Natural History has a full time technical officer who works in the Microscope Lab and she will also contribute approximately 500 hr to assisting in data entry.

Fulltime Initiative Personnel
Both persons will be employed at ANU Level A6 (2x $68524 includes 26% on costs with 2.5% = $1360 as ANU costs). (1) Research Associate in Palynology: A Research Associate with expertise in palynology will be employed for the year to edit and expand the existing pollen and spore identification databases, compile a key research digital image collection of ~2000 pollen and spore taxa, and assist in co-ordinating the initial and post e-Research workshops. They will work closely with the CI’s and RA’s and will travel and liaise with collaborating institutions holding images and meta-data during this period. (2) Research Associate in Data Management: A Research Associate with expertise in programming, data management and web design will be employed for the year to develop the federated pollen and spore database through to final delivery at the post e-Research workshop. They will work closely with the CI’s and RA’s and will travel and liaise with collaborating institutions holding images and meta-data during this period.

TRAVEL
Workshop activities: Travel support for two international and eight national participants is required to bring together the Initiative participants at a venue at ANU in July 2005. The international participants are world-leaders in their respective fields and will be crucial to developing internationally compatible protocols and structure for the database over the year. Travel costs cover international return airfares and domestic airfares for participants living outside the workshop venue location. Accommodation for the 3-day workshop is required as follows: five nights for international participants and three nights for domestic participants. Catering and a room with multi-media facilities will be hired for the workshop.

ICT short visits: Both Research Associates will visit the 8 collaborating institutes to liaise with contact people regarding data access (2x $500 x 8 visits).

Post-funding workshop: All national collaborators and additional potential users (up to 10 industry/institute representative will be invited) will be included in this post-funding workshop.
D1 AUSTRALASIAN POLLEN AND SPORE ATLAS

D2 AIMS, SIGNIFICANCE AND BACKGROUND

Advances in the fields of environmental, health and biological sciences often are built upon access to high quality reference collections that support ongoing and generate future research endeavours. The building of a pollen and spore reference collection into a widely accessible online Atlas is emerging as a fundamental resource needed across these wide fields of research. An archived, federated, searchable and online reference collection of key Australasian pollen and spore grains would provide a critical resource to support emerging areas of high profile research including work in: airborne allergens and respiratory disease, past, present and future environmental change, evolutionary and systematic biology, biostratigraphy (oil and gas), and forensic sciences. Traditional approaches to archiving and using pollen and spore reference collections have relied on onsite use and hardcopy exchange of material which is both time consuming and labour intensive. Furthermore this approach has promoted duplication of effort in different laboratories.

By adopting new and innovative approaches to data management and distribution this proposal aims to:

1. Enhance current independent efforts to construct pollen and spore collections by creating an online web query interface that federates images and information from existing data sites.

2. Construct an online identification key with highest quality digital images that incorporates a relational information database for 2000+ key pollen and spore species that is accessible to both professional and novice users.


The construction of regional pollen and spore databases in the northern hemisphere and elsewhere in the southern hemisphere has proven to be an invaluable and widely utilized tool for developing new areas for research across a wide range of disciplines (e.g. Marchant et al. 2002, Szibor et al. 1998). Most notably in the field of palaeoclimate and palaeovegetation reconstruction there has been a great deal of effort into constructing multi-proxy databases that not only provide access to pollen and spore images, but bring fossil sites data and modern and past distributional data into integrated relational database. The impact of this effort is reflected in the high-profile outcomes in palaeo-environmental research (Huntley and Prentice 1988, Tzedakis et al. 2002, Bennett, Haberle and Lumley 2000) from Europe and the Americas.

In Australia existing collections of pollen and spore types are fragmented and there has been no attempt to co-ordinate or integrate this information. The Natural History section of the Department of Archaeology and Natural History (ANH), Australia National University, holds the largest collection of modern pollen of southeast Asia- Australia in the world, amounting to about 14000 taxa from Australia, Southeast Asia and the Pacific (ANH Pollen Collection). This collection has developed through a long term research effort in palaeoclimatology, palaeoecology, archaeology and more recently in aerobiology (ARC Linkage Grant with the Menzies School of Health Research, Charles Darwin University) and continues to support high-profile research outcomes in the Departments research areas (e.g. Denham, Haberle et al. 2003 Science). Smaller collections are held at other institutions including Monash University (Monash Pollen Database, 4000 species from Australia and Southeast Asia), University of Newcastle (2000 species from Australia, Shimeld et al. 2000), University of Sydney (Wooolcock Institute of Medical Research, 200 species with allergenic properties, Hjelmroos et al. 1999), the Australian Nuclear Science and Technology Organisation (ANSTO, 200 species from Australia), and Southern Cross University (2000 species from Australia and New Guinea, particularly fern spores). Botanical information on all species is held in the herbaria around Australia (mainly at the Australian National Botanic Gardens Canberra).
These collections have developed from specific local institution research needs and in all cases have generated information relational databases associated with specific research aspects of the collections. For example the ANH Pollen Collection laboratory also hosts the Indo-Pacific Pollen Site Database which collects available data on vegetation change derived from identification of pollen from fossil setting for the area from tropical India, through Australia and to Easter Island. The information is available spatially and the results can be interrogated chronologically. This database is a keystone of global programs for testing palaeoclimate models, vegetation change, landscape change and human effects on catchments and fluvial systems. In addition, the ANH initiative has made us a regional centre of the Global Pollen Database, which is centred in Boulder, Colorado (http://www.ncdc.noaa.gov/paleo/gpd.html), and has already been used in several major global vegetation-climate modeling projects (Prentice 2001). This information will be integrated into the Atlas to allow queries on the spatial and temporal occurrence of key pollen and spore taxa. A second example is held at the Woolcock Institute of Medical Research, University of Sydney, collection of 200 pollen and fungal spore species that have been entered into the Airborne Allergen Database (Hjelmroos et al. 1999). This database is designed to assist with the identification of pollen and spores, which are either known to be important species for allergenic reactions in asthma and hayfever, or are likely to be confused with such species. The database is designed to be used by medical practitioners, lab technicians and as a resource for plant industry personnel and has been a key resource for developing airborne allergen studies in the region (Benyon et al. 1999). A common characteristic of all collections is that there exists a large and rapidly growing volume of data associated with the pollen and spore taxa represented, which risks being lost (due to limited funding) or being duplicated (due to disparate locations and/or discipline boundaries).

In order to establish a working database that can function in a multi-disciplinary environment, with the potential to break down inter-disciplinary boundaries, the Australasian Pollen and Spore Atlas will not only have the attribute of enabling continued development of collections of pollen and spore data at independent institutions, but provide a federated platform for development of an interactive and unified database available to the wider professional and novice community. Advances in the development of applications to manage large information repositories in intranet/internet information services, data mining and digital image acquisition and distribution are currently at the forefront of activities at the Internet Futures Group, Division of Information (http://if.anu.edu.au/) at ANU. Furthermore, the establishment at ANU of DSpace (www.dspace.org), a digital repository designed to capture, store, index, preserve, and redistribute information in digital formats provides an ideal setting to locate the federated Australasian Pollen and Spore Atlas online. Close collaboration with Internet Futures Group (CI3, Buchhorn) and DSpace personnel will assist in providing novel and groundbreaking approaches that will be critical to achieving the Australasian Pollen and Spore Atlas.

D3 OUTLINE OF THE PROPOSED INITIATIVE

The interactions, activities, outcomes and potential research spinoffs of this proposal are outlined in Figure 1. The 3 principle aims of this proposal will be achieved through a series of parallel activities.

Development workshop (July 2005)

The initial 3-day workshop at ANU will bring together the key collaborators to focus on (1) ratifying agreements to provide access to data, and if necessary establish limitations of access to specific data (eg. restricting access to unpublished data to a registered working group), (2) developing a unified structure and protocol for contributing to the Australasian Pollen and Spore Atlas, and (3) construct a targeted species list for high-resolution image capture (~2000 species) for inclusion in the final Atlas product. The inclusion of two key international
participants (Dr Chengyu Weng and Dr Rachid Cheddadi) who are familiar with constructing similar databases in South America and Europe will enhance the potential compatibility of our database with other international databases.

**High-resolution digital image acquisition and identification key architecture (1 year)**

The quality and resolution of pollen and spore taxa digital imagery that currently exists in the Australasian region is highly variable. In order to establish a highest quality/resolution standard for a proportion of pollen and spore taxa in the Atlas we will use state-of-the-art digital cameras to acquire images of approximately 2000 targeted species during the year. These images will form the keystone component of the Atlas, and along with the much more voluminous lower quality images that already exist, will enhance the research capacity of the database. The recent acquisition of a Zeiss AxioImager M1 mot research microscope with high-resolution digital camera (Axiocam MRC) at the Microscope Lab in the Department of Archaeology and Natural History (ANU) provides the capacity to acquire highest quality visible-light digital images. The capacity to incorporate SEM images of selected taxa will also be provided (through the SEM Unit at ANU). A critical component of the Atlas will be the incorporation of a taxa identification tool that allows for professional as well as the technical novice to be involved in pollen and spore identification. While suitable pollen and spore identification keys are already available, the web architecture for an online key needs to be developed. The ANU team will collaborate closely with members of the Woolcock Institute of Medical Research and Key Centre for Microscopy and Microanalysis, University of Sydney, where a suitable model for a searchable identification key has been constructed. This will involve the development of a metadata standard for the digital description of each pollen and spore taxa.

**Figure 1.** Flow diagram of the proposed collaborators to the e-Research activities with a focus on the ANU Pollen Database. These activities lead to the primary outcome of the development of a Federated Database (The Australasian Pollen and Spore Atlas). The predicted users cross a multi-disciplinary field with potential novel interactions that would follow from the development of this resource.
Accessibility to the large collections of pollen and spore information in the Australasian region is limited by distance between active laboratories and lack of compatibility and/or online presence of existing databases. This part of the e-Research activity will develop tools for a federated database that is accessible over the web, with a straightforward query interface, and is suitable for professional as well as the technical novice involved in pollen and spore identification. The development of a user-friendly search engine and query interface to the federated database will be key to the success of the Atlas. By incorporating the expertise at ANU from the Internet Futures Group and DSpace (Division of Information) the federation of a wide range of smaller existing pollen and spores databases with associated specific research information will result in The Australasian Pollen and Spores Atlas. The Atlas will be a flexible and powerful knowledge management tool with the potential to evolve and be applicable to ongoing research development by a wide range of users including those within diverse disciplines such as archaeology, biology, geology, and medicine. The resulting interactions between a wide range of users can finally free researchers from relying on outdated collations of interpreted data and particularly support the linking of physical and social datasets. For example a social scientist interested in environmental change can assemble chronologically matched multi-proxy data for a single region, rather than rely on a broad (in time or space) estimate of past environmental change that may ignore local situations. Similarly, an agrobiologist interested in the pollination characteristics of particular exotic crop or weed species can access data or expertise from the local region of interest rather than rely on assumed characteristics derived from the country of origin of the plant.

The proposal falls within the National Priority of Frontier Technologies for Building and Transforming Australian Industries – Smart Information Use. The development of an Australasian Pollen and Spore Atlas will vastly improve the management and distribution of a data set that has a wide range of potential users from professional to novice levels. The proposal will develop a new system of data management tailored to pollen and spore research, but with the potential to be accessed and used by a much broader community. The ability of laboratories and institutes to operate virtually and collaborate across huge distances in Australia and internationally hinges on our capabilities in this area. This proposal recognizes the huge potential in the rapidly evolving digital media industry that must be exploited to maintain the high profile of Australian research.

D4 COLLABORATION

The construction of a viable Australian Pollen and Spore Atlas that provides for expansion and evolution of individual pollen collections and associated meta-data requires a strong cooperative collaboration between groups actively engaging in related research. The Initial e-Research Workshop to be held in Canberra in July 2005 will facilitate this collaboration and provide a platform to progress towards the production of the online federated Atlas. The national key contributors to this process are outlined below.
### National collaborations

<table>
<thead>
<tr>
<th>Contact name</th>
<th>Institute</th>
<th>Role in e-Research Initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Henk Heijnis</td>
<td>Australian Nuclear Science and Technology Organisation</td>
<td>Contributing to the federated database. ANSTO Pollen Database consists of 200 species from Australia.</td>
</tr>
<tr>
<td>Dr Stuart Pearson</td>
<td>University of Newcastle</td>
<td>Contributing to the federated database. University of Newcastle Pollen Collection consists of 2000 species from Australia in a searchable database.</td>
</tr>
<tr>
<td>Dr Bill Boyd</td>
<td>Southern Cross University</td>
<td>Contributing to the federated database. The Southern Cross Pollen Database consists of 2000 species from Australia and New Guinea, with particular emphasis on fern spores.</td>
</tr>
<tr>
<td>Prof Peter Kershaw</td>
<td>Monash University</td>
<td>Contributing to the federated database. Monash Pollen Database consists of 4000 pollen and spore species from Australia and Southeast Asia. The databases include a pre-European baseline dataset on pollen assemblages in Southeast Australia.</td>
</tr>
<tr>
<td>Prof Euan Tovey</td>
<td>Woolcock Institute of Medical Research, University of Sydney</td>
<td>Contributing to the federated database. The Airborne Allergens Database consists of 200 pollen and spore species with information of their allergenic properties.</td>
</tr>
<tr>
<td>Dr Allan Jones</td>
<td>Key Centre for Microscopy and Microanalysis, University of Sydney</td>
<td>Contributing to the design of the Pollen and Spore identification key and structure of the Atlas database.</td>
</tr>
<tr>
<td>Dr Fay Johnston</td>
<td>Menzies School of Health Research, Charles Darwin University</td>
<td>Contributing to the federated database. ARC Linkage grant “Darwin Smoke Project” provides pollen and spore reference collections to the Australian National University.</td>
</tr>
<tr>
<td>Dr Lyn Craven</td>
<td>Australian National Botanic Gardens</td>
<td>Contributing to the federated database. Botanical information on the parent plant of key pollen and spore taxa represented in the Atlas.</td>
</tr>
<tr>
<td>Dr Peter Raftos</td>
<td>Division of Information, ANU</td>
<td>Advisor on data management of large format digital images. DSpace project officer.</td>
</tr>
</tbody>
</table>

The proposal will draw on and seek to develop key international collaborations. The inclusion of two key international participants from France and USA who are familiar with constructing pollen databases in Europe and South America will enhance the potential compatibility of our database with other international databases. Many of the databases have drawn on links with regional countries to contribute to the collections. These countries include New Caledonia, Indonesia, East Timor, Papua New Guinea, and Fiji. The Atlas will include a short explanation of its operation in the lingua franca of these countries.

### D5 INFRASTRUCTURE

The Natural History section of the Department of Archaeology and Natural History holds the largest collection of modern pollen of southeast Asia- Australia in the world, and has successfully archived and supported this collection for the last 30 years. ANH has also
developed a web based Indo-Pacific Pollen Atlas based on its pollen collection, and this is
running in a preliminary form as an aid to palaeoecologists and plant taxonomists world wide.
The research capacity of the Department has been further boosted by the awarding of a large
equipment grant in 2005, which provided for state-of-the-art microscopy and digital imaging
facilities in the Microscope Lab. This includes a Zeiss AxioImager M1 mot research microscope
with high-resolution digital camera (Axiocam MRc) with a networked computer. The Research
School of Pacific and Asian Studies will further support this proposal through the supply of 2
PC workstations for each Research Associate and technical assistance for data entry and
curation of the collection.

The challenge now is to make this and other similar collections accessible and useable to the
research and wider community. The global reputation of the collection and its critical role
played in the research success of members of ANH highlight the capacity of ANH and the wider
Research School of Pacific and Asian Studies to administer this project. The presence of leading
research groups and computing facilities in e-Research at ANU (Internet Futures and DSpace
within the Division of Information) places the university in a leading position to support this
proposal.

D6 EXPECTED OUTCOMES

The proposed e-Research development of an Australasian Pollen and Spore Atlas promises to
open up new methodological possibilities for contemporary and future generations of
researchers who use pollen and spore information. Creating the Atlas will not only make many
research tasks less labour intensive but also enable research projects to be more comprehensive
and interdisciplinary. It will lead to greater efficiency in many areas of our research at ANH, an
important issue for research degree completions, and provide this capacity to all users. Ensuring
that researchers within the key disciplines associated with the proposal have current
technologies readily available to them is also essential for maintaining and enhancing
Australia’s position as a world leader in research in the Asia-Pacific region and as a desirable
national and international collaborator in such research.

The three key outcomes of this proposal will be:

1. Increased research capacity across the institutes involved in this project through a
   reduction in duplication and enhanced accessibility to key knowledge available in the
   Australasian Pollen and Spore Atlas.

2. Provision of a user-friendly web/query interface, with a powerful and fast search engine,
   accessible to professionals as well as novices and students. The Atlas design will have
   the potential to be adopted by other researchers who require detailed reference
collections to support their work (eg. existing bone collection and wood collection at
   ANU).

3. Generation of novel and ongoing research links between the principle collaborators and
   other users.

The proposal contributes to the National Priority of Frontier Technologies for Building and
Transforming Australian Industries – Smart Information Use. The Australasian Pollen and
Spore Atlas will vastly improve the distribution of digital images and related information that
will target a wide range of users ranging from professional to novice and student levels. The
ability of laboratories and institutes to operate virtually and collaborate across huge distances in
Australia and internationally hinges on our capabilities in this area. The results of this proposal
will tap the huge potential in the rapidly evolving digital media industry. This is an area that
must be exploited to maintain the high profile of Australian research.
D7 DESCRIPTION OF PERSONNEL

CI-1: Dr Simon Haberle has joint responsibility for the conception of the project, managing day-to-day activities and co-ordinate the workshops. He will work closely with the post-graduate personnel to assist in achieving the aims of the proposal. He is a leading pollen expert for the tropical Pacific, New Guinea and Australia and has directed successful archaeological and palaeoecological projects in the past. He is currently conducting a major study on the history of the impact of El Niño events on ecosystems across the Pacific Basin.

CI-2: Prof. Geoff Hope has joint responsibility for the conception of the project, managing day-to-day activities and will participate in the workshops. He will also work closely with the post-graduate personnel to assist in achieving the aims of the proposal. He is a leading pollen expert for the Australasian region and has participated in and led the development of a regional pollen and spore database for the region.

CI-3: Dr Markus Bucchorn is a Head of the Internet Futures Group, Division of Information at ANU and he will participate in the direction and management of research done by the programming personnel and web interface designers. He is a leading expert in large-scale data management, storage/delivery, content distribution networks, metadata management and currently is involved in e-Research-infrastructure development and support at ANU.

Research Associate (Level A6) – Palynology, Image Acquisition, Database Editing
A Research Associate with expertise in palynology will be employed for the year to edit and expand the existing pollen and spore identification databases, compile a key research digital image collection of ~2000 pollen and spore taxa, and assist in co-ordinating the initial and post e-Research workshops. They will work closely with the CI’s and RA’s and will travel and liaise with collaborating institutions holding images and meta-data during this period.

Research Associate (Level A6) – Programmer, Data Management, Web Design
A Research Associate with expertise in programming, data management and web design will be employed for the year to develop the federated pollen and spore database through to final delivery at the post e-Research workshop. They will work closely with the CI’s and RA’s and will travel and liaise with collaborating institutions holding images and meta-data during this period.

Research Assistant (ANU Level 5) – collection curator, general assistance
A casual research assistant with lab and data entry experience will be employed for 500 hours to assist in the curation of the existing pollen and spore collection at ANU. They will also help in data entry and data checking for the Atlas during the year. The Department of Archaeology and Natural History has a full time technical officer who works in the Microscope Lab and she will also contribute approximately 500 hr to assisting in data entry.

D8 ADMINISTERING ORGANISATION CAPACITY
The Australian National University has developed a global reputation of highest quality research capacity in the key areas of computational and palynological studies. The Division of Information is a world leading institute in computational science with a focus on e-Research potential. The combined presence of the Internet Futures Group and the establishment of the DSpace facility at ANU place the university in a leading position to support this proposal. The Research School of Pacific and Asian Studies have continued to support one of the most extensive pollen collections in the world and has supported its development through technical assistance and continued support for research programs developed around this resource.
References


