



VeRSI

Victorian eResearch  
Strategic Initiative

# VeRSI Ecoinformatics Climate Change Demonstrator Program – An eResearch Approach

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28<sup>th</sup> October, 2009  
Hanoi, Vietnam

# VeRSI

- Victorian eResearch Strategic Initiative
- 5 Year Program 2006-2011
- State Govt funded
- An unincorporated JV

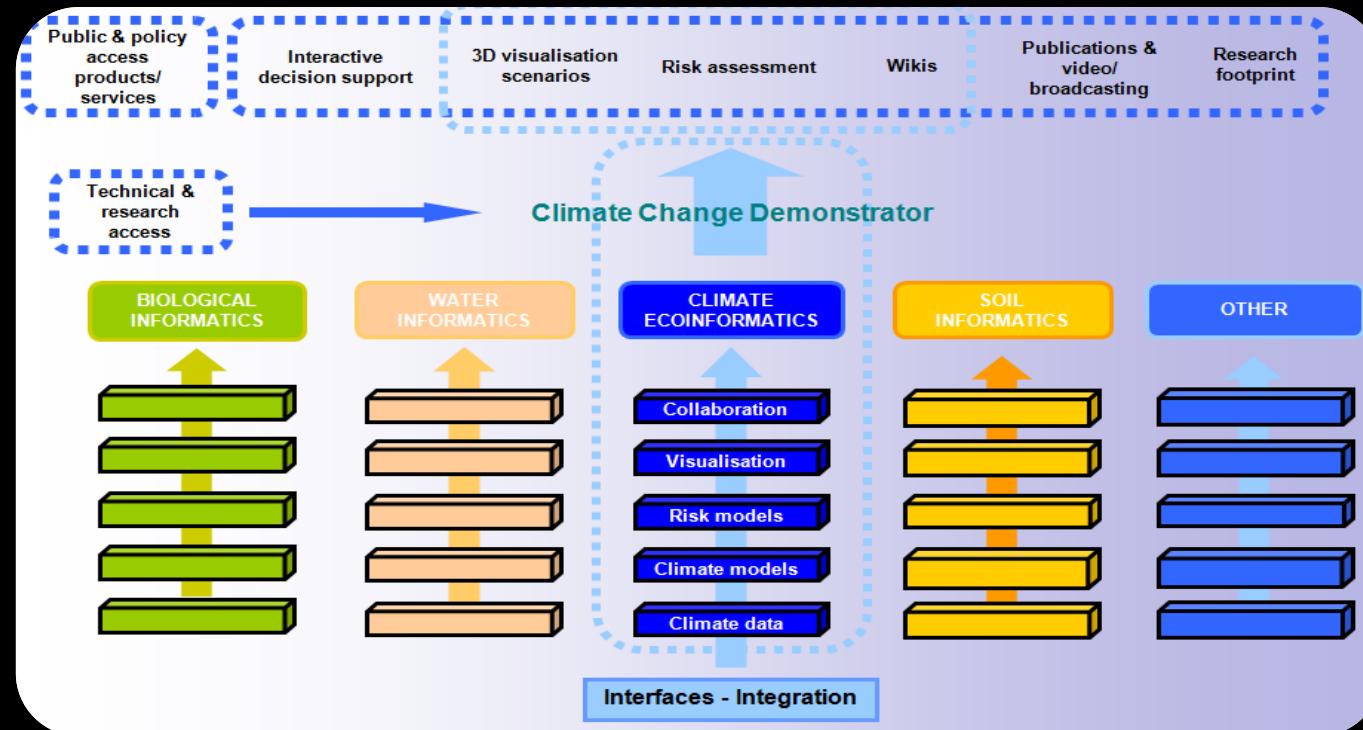
## eResearch

- Cyberinfrastructure (US)
- eScience (UK)



# Ecoinformatics Program

- Goal: An online collaborative and shared resource for managing ecosystem and environmental data and information products.



# Ecoinformatics Program

VeRSI Ecoinformatics Climate Change Demonstrator Program

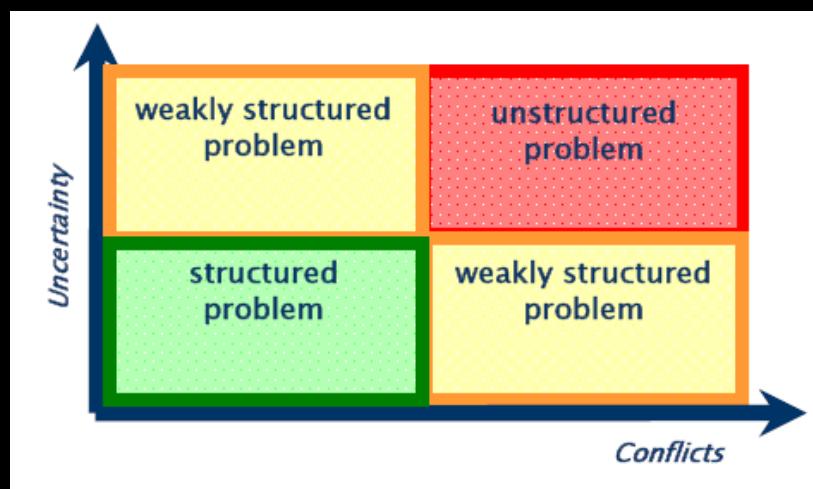
- e-Resource Centre (eRC) Environment
  - Security, Wiki, Repository
  - Models, Information & Data
  - Virtual Organisation
- MIKE Metadata Registry
- Workflow Platform
- Geospatial Visualisation



# Wicked Problems

Structured problems are tractable and understandable and often have a single and optimal solution.

Weakly or unstructured problems are characterised by high levels of uncertainty, potential conflicts, or both. Ludwig (2001) called them “wicked” problems with no definitive formulation, no stopping rule, and no tests for a solution.



Donald Ludwig. The era of management is over. *Ecosystems*, 4(8):758–764, December 2001

# Climate Change

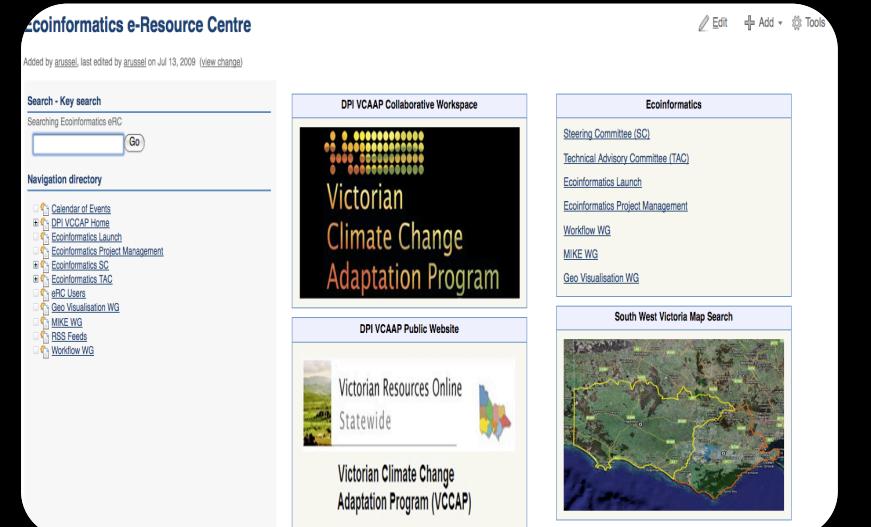
- IPCC 4th report – “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.”

- Climate Change:
  - Mitigation
  - Impacts Adaptation



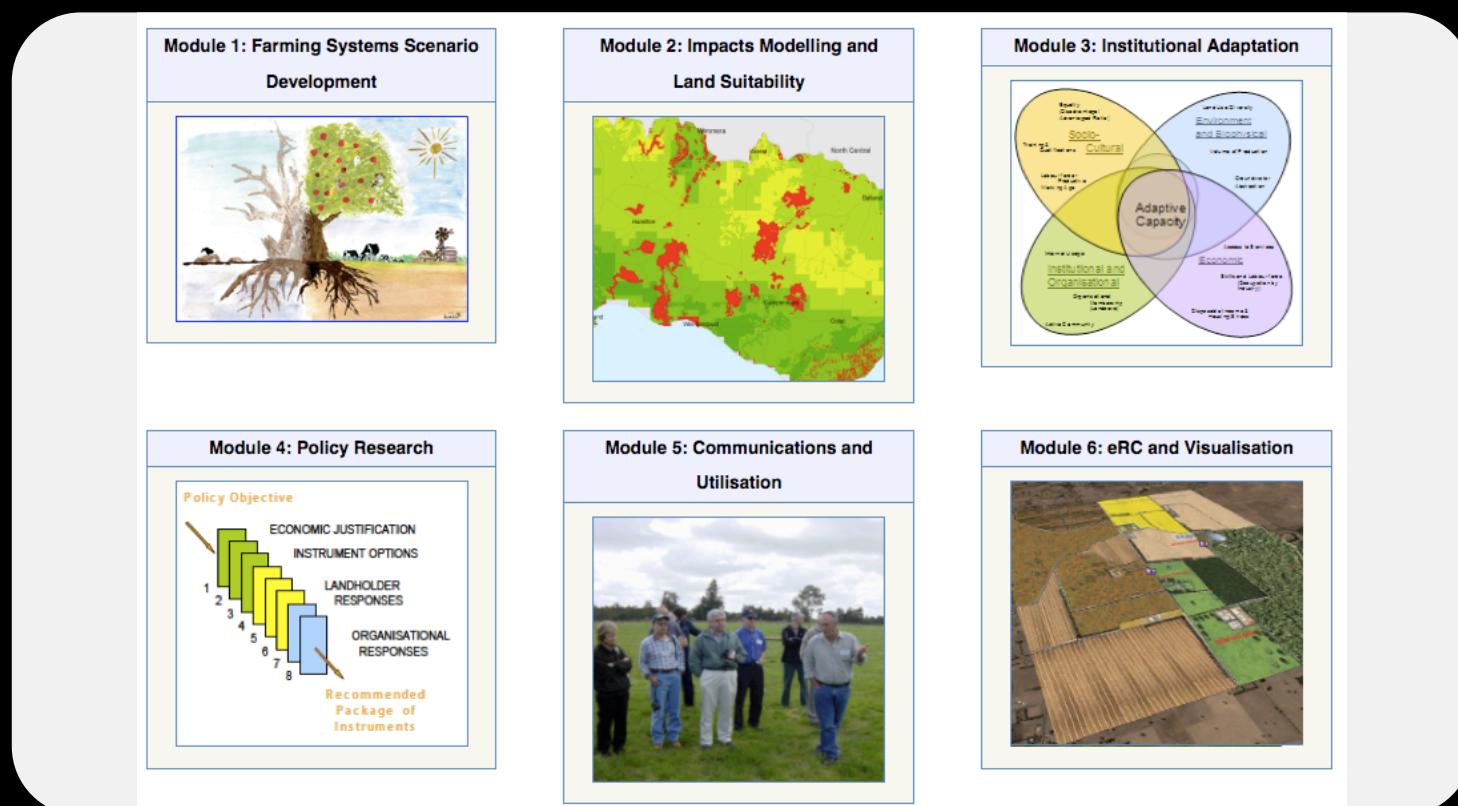
# e-Resource Centre (eRC) Environment Platform

- Neutral – sits on VeRSI environment
- Trustable
- Provides:
  - Sensitivity
  - Data Integrity
  - Integration
  - Accessibility by Government and Universities
  - Manage the research process



# VCCAP

## Victorian Climate Change Adaptation Program



# Challenges we faced

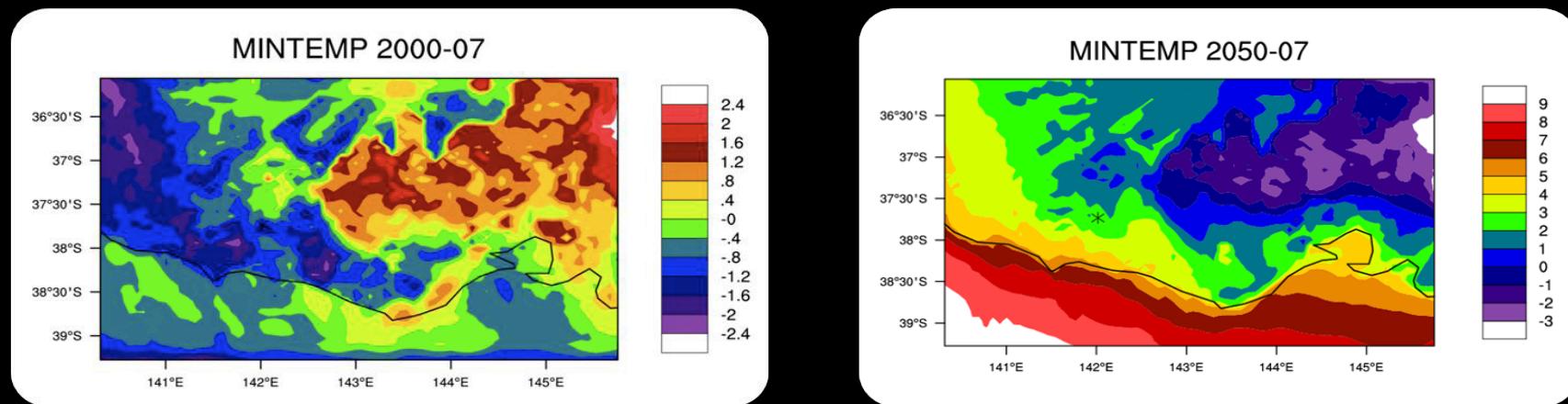
- Whether sharing services or sharing data:
  - Who owns it?
  - Who runs it?
  - Who gets credit?
  - Who maintains it?
  - Who shuts it down?
  - Who retains it?



# Demo



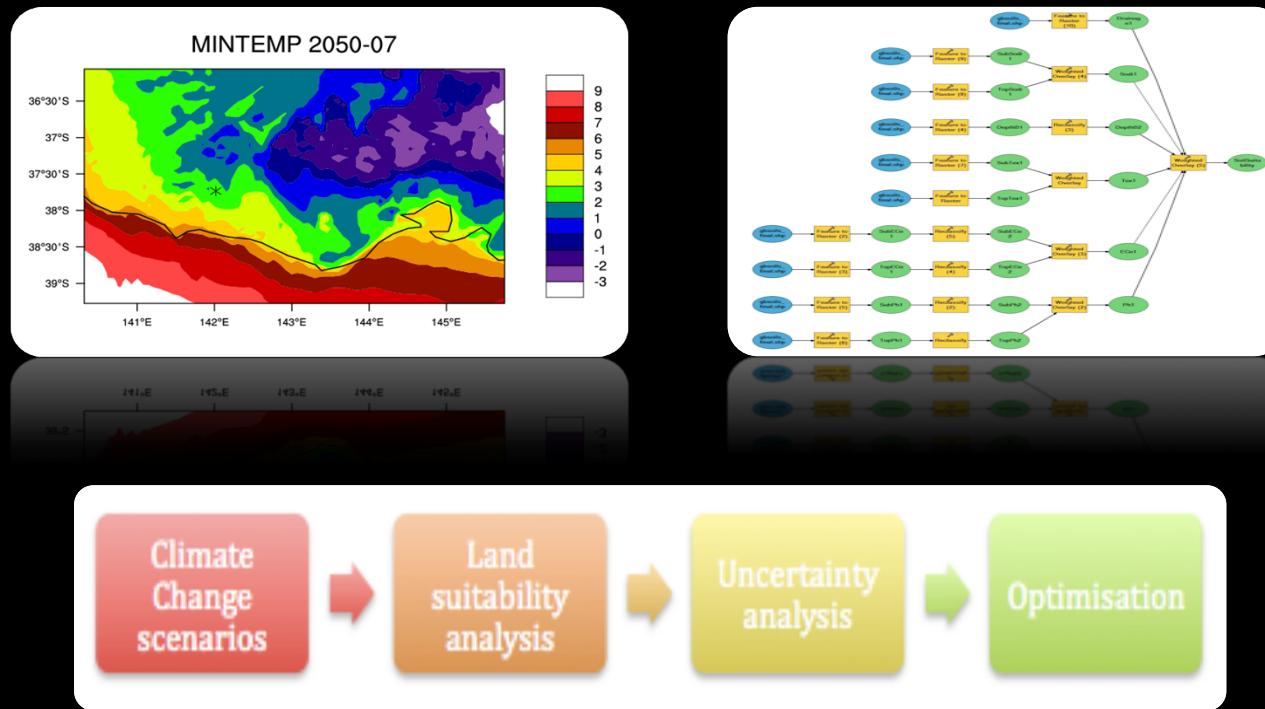
# Climate Modeling



Climate Modeling

Prof. Amanda Lynch  
Monash University

# Workflow Platform

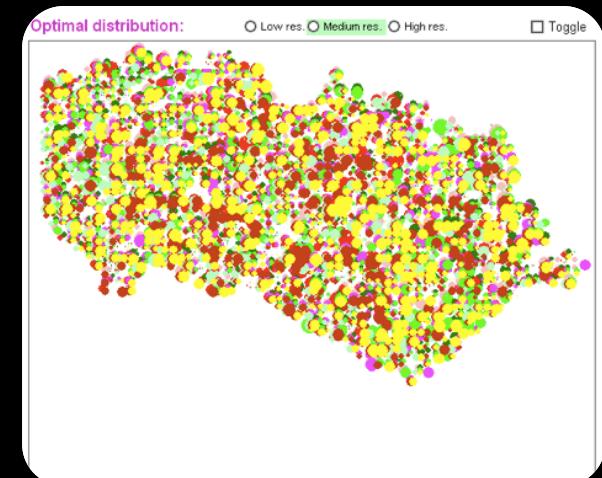


Workflow Platform

Prof. David Abramson  
Monash University

# Workflow Platform

- Climate change scenarios
  - B1, A2, A1FI scenarios
- Land suitability & uncertainty analysis
  - Biophysical (soil, climate, landscape) factors
  - Weights from LSA experts
- Optimisation
  - Land suitability,
  - Climate projection,
  - Revenue & Market saturation.



# Model Information Knowledge Environment (MIKE)

- A metadata registry for environmental models used in land suitability analysis

The screenshot shows the 'Query Module' interface. At the top, there are three tabs: 'Query Module' (selected), 'Map Module', and 'Admin Module'. Below the tabs is a 'Search Criteria' section with a dropdown menu set to 'Model Names' and a text input field containing 'enter search term'. Underneath is a 'Results Summary' section showing a tree view of existing models: 'Existing Models' -> 'APSIM' -> 'APSIM', and other models like 'CAT', 'ClimGen', 'CropSyst', and 'CVA'.

The screenshot shows the 'Admin Module' interface. It displays a table titled 'APSIM - Model Descriptions (4)' with columns for Description Type, Description ID, Registered Date, Record Owner, and Record Behaviour. The data is as follows:

Description Type	Description ID	Registered Date	Record Owner	Record Behaviour
Abstract	32	Wed, 07 Nov 2007	sw10	
Purpose	34	Wed, 07 Nov 2007	sw10	
Overview of Model Inputs	35	Wed, 07 Nov 2007	sw10	
Packages/Components	33	Wed, 07 Nov 2007	sw10	

Below the table is a detailed description of the APSIM environment:

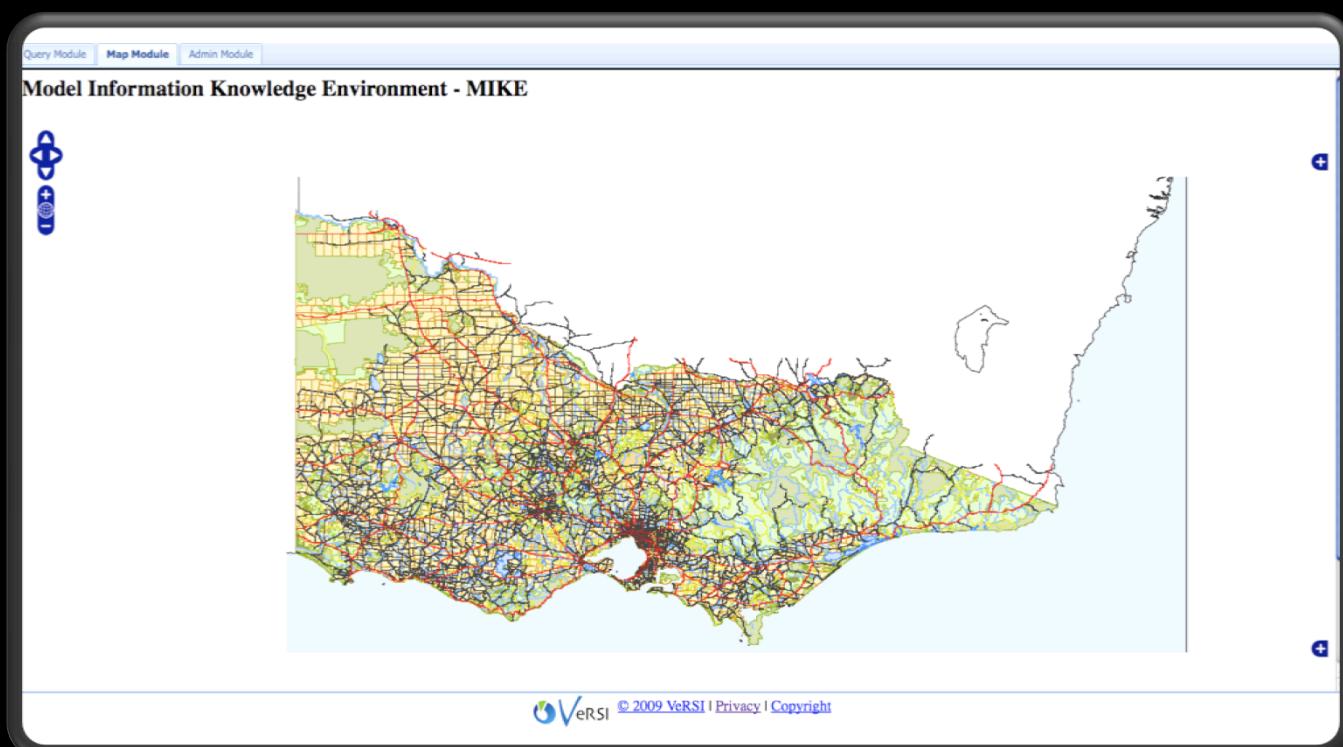
The APSIM environment is an effective tool for analyzing whole-farm systems, including crop and pasture sequences and rotations, and for considering strategic and tactical planning. APSIM allows users to improve understanding of the impact of climate, soil types, and management on crop and pasture production. It is a powerful tool for exploring agronomic adaptations such as changes in planting dates, cultivar types, fertilizer/irrigation management, etc.

Dr. Chris Pettit & Dr. Steve Williams  
DPI



# MIKE Mapping

Using OGC reference implementation  
FOSS: Geoserver, OpenLayers, PostGIS



# Geospatial Visualisation



Prof. Ian Bishop  
The University of Melbourne



# 3D Object Library

Object Description	GPS Coordinates	Object	File Format	File Size	File	Thumbnail
Banksia		2D Image	PNG	347 KB	<a href="#">banksea.png</a>	
Banksia		2D Image	PNG	342 KB	<a href="#">Banksia.png</a>	
Banksia seaside shrub		2D Image	PNG	342 KB	<a href="#">banksia_seaside.png</a>	
Blackwood Wattle		2D Image	PNG	338 KB	<a href="#">blackwood_wattle2.png</a>	

BLACKWOOD WATTLE

SD Image

PNG

338 KB

banksea.png

3D Object Library  
DSE, DPI, CRC-SI, UoM, VeRSI

# Need new strategies

- Australia records new high temperatures
- 350+ Dead in Aussie bushfires in Feb, 2009
- We need new strategies - climate is changing!



# Summary



Image NASA  
© 2005 Europe Technologies  
© 2006 Tele Atlas  
© 2006 Bassinsoft

©2006 Google™

# Many Thanks

- Thanks to IOIT, VAST – PRAGMA 17 host
- Special thanks to Prof. Peter Arzberger, Yoshio Tanaka, and all other PRAGMA 17 organising committee members
- Acknowledgement to VeRSI team, program Principal Investigator Dr. Chris Pettit (DPI) and all researchers & developers engaged in various VeRSI projects.
- Also special thanks to Multimedia Victoria for funding this activity.



# Questions?

Thank you!

[www.versi.edu.au](http://www.versi.edu.au)

VeRSI VLSCI HD video seminar series streaming  
at PRAGMA 17 is on Friday, 30<sup>th</sup> October, 2009 from 8am to 9am.

Web streaming link: [http://202.158.196.141/login\\_home.html](http://202.158.196.141/login_home.html)

