

# **Australasian Conference on Robotics and Automation 2005**

**(ACRA 05)**

**Sydney, Australia  
5 – 7 December 2005**

**ISBN: 978-1-63266-033-6**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2005) by the Australian Robotics and Automation Association  
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact the Australian Robotics and Automation Association  
at the address below.

Australian Robotics and Automation Association  
GPO Box 1527  
Sydney NSW 2001  
Australia

Phone: 61 7 3327 4501  
Fax: 61 7 3327 4455

[www.araa.asn.au](http://www.araa.asn.au)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# Australasian Conference on Robotics and Automation 2005

## Table of Contents

### Invited talk

[Beyond Geometric Mapping](#) """"3

Henrik I Christensen

### Architectures and Programming

[On specifying reactivity in robotics](#) ""5

Geoffrey Biggs & Bruce MacDonald

[Player 2.0: Toward a Practical Robot Programming Framework](#) """"34

Toby H. J. Collet, Bruce A. MacDonald & Brian Gerkey

[DDXVIDEO: A Lightweight Video Framework for Autonomous](#) """"42

[Robotic Platforms](#)

Elliot Duff

[Framework for the Long-Term Operation of a Mobile Robot via](#) """"49

[the Internet](#)

Shervin Emami, Gordon Wyeth, Michael J. Milford, David P. Prasser

[Development of an Integrated Robotic Programming](#) """"59

[Environment](#)

Luke Gumbley and Bruce A MacDonald

### Control

[Predicting Grasp Inertia with a Geometric Model](#) """"67

Gideon Kowadlo, Jason Friedman & Tamar Flash

[Passivity-based Control of Robot Manipulators Sub ject to](#) """"76

[Constraints](#)

Khoi B Ngo & Robert Mahony

[Automated Vehicle Stability Control for Articulated Vehicles](#) """"84

Bradley Stevenson & Peter Ridley

[Fuzzy Associative Memory for Humanoid Robot Joint Control](#) """"93

Doug Turk, Damien Kee, Chris Myatt & Gordon Wyeth

[Motion Analysis for Decentralized Control of N-Module Hyper-](#) """"9:

[Redundant Manipulators](#)

Timothy Vittor & Richard Willgoss

## **Learning**

[Active Object Discovery for Communicating with Humans](#) '': 8  
Claire D'Este & Claude Sammut

[Applying ISOMAP to the Learning of Hyperspectral Image](#) ''; 5  
X. Rosalind Wang, Suresh Kumar, Tobias Kaupp, Ben Upcroft  
and Hugh Durrant-Whyte

## **Localisation and Data Fusion**

[UAV Localisation & Control Through Computer Vision](#) ''323  
William Bath & Jonathan Paxman

[Tightly Coupled INS/GPS with Bias Estimation for UAV Applications](#) ''329  
Michael George & Salah Sukkarieh

[3D Sensing Framework for Outdoor Navigation](#) ''336  
Roman Katz, Narek Melkumyan, Jose Guivant, Tim Bailey &  
Eduardo Nebot

[Decentralised Data Fusion with Particles](#) ''344  
Lee-Ling Ong, Ben Upcroft, Matthew Ridley, Tim Bailey, Salah  
Sukkarieh & Hugh Durrant-Whyte

[Adaptive Sensing for Localisation of an Autonomous Underwater Vehicle](#) ''354  
Paul Rigby & Stefan B. Williams

[A Monocular Vision Based Localizer](#) ''35;  
Zhengzhi Zhang and K. R. S. Kodagoda

## **Multi-Agent Systems**

[A Flexible Human-Robot Team Framework for Information Gathering Missions](#) ''367  
Shaun Brown, Jake Toh and Salah Sukkarieh

[Using political science voting models to determine weightings in multi-objective decision problems](#) ''375  
Andrea Abel & Salah Sukkarieh

[Controlling formations of multiple mobile robots with inter-robot collision avoidance](#) ''383  
H.M. Ha, A.D. Nguyen & Q.P. Ha

[Quantitative Modeling of Multi-Agent Systems](#) ''38:  
Jason Held & Salah Sukkarieh

[Multiple Robot Path Planning Strategies for Bush Fire Fighting](#) ''397  
Ray Jarvis & Kai Wing Tang

[Control of Contour Formations of Autonomous Vehicles by General Curve Evolution Theory](#) ''3: 3

Shahab Kalantar, Uwe R. Zimmer

### **Planning and Reasoning**

[Non-monotonic Reasoning for Localisation in RoboCup](#) '3: ;

David Billington, Vlad Estivill-Castro, Rene Hexel & Andrew Rock

[Pursuit Games in Obstacle Strewn Fields Using Distance Transforms](#) '3; ;

Ray Jarvis & Mohamed Marzouqi

[Integration of Planning and Control in Robotic Formations](#) '426

V.T. Ngo, A.D. Nguyen & Q.P. Ha

[Path planning for a Parking Assistance System: Implementation and Experimentation](#) '434

C. Pradalier, S. Vaussier & P. Corke

### **Sensors**

[Advanced Airflow Modelling Using Naive Physics for Odour Localisation](#) '444

Gideon Kowadlo & R. Andrew Russell

[Congregation Behaviour in a Robot Swarm Using Pheromone Communication](#) '454

Anies Hannawati Purnamadjaja & R. Andrew Russell

[Robot Communication via Substrate Vibrations](#) '45;

Ari Silvola & R. Andrew Russell

[Experiments on the Audio Frequency Response of Shape Memory Alloy Actuators](#) '467

Yee Harn Teh & Roy Featherstone

[Face Recognition with CTFM Sonar](#) '473

Kok Kai Yoong & Phillip McKerrow

### **SLAM**

[Bearing-Only SLAM for an Airborne Vehicle](#) '483

Mitch Bryson & Salah Sukkarieh

[Uncertainty Analysis of a Landmark Initialization Method for Simultaneous Localization and Mapping](#) '492

Henry Huang, Frederic Maire & Narongdech Keeratipranon

[Towards Robust Airborne SLAM in Unknown Wind Environments](#) '49:

Jonghyuk Kim & Salah Sukkarieh

[Experience Mapping: Producing Spatially Continuous Environment Representations using RatSLAM](#) '4: 7

Michael Milford, David Prasser & Gordon Wyeth

## **Systems and Automation**

[CASTER: A Robot for Urban Search and Rescue](#)''''''''4; 7

Mohammed Waleed Kadous, Raymond Ka-Man Sheh & Claude Sammut

[Part Tracking, Routing and Scheduling of Products for Mass Customization](#)''''''527

Priyen Naidu, Glen Bright & O Diegel

[Small-scale Aeroelastic Rotor Simulation, Design and Fabrication](#)''''''532

Paul Pounds & Robert Mahony

[Fish-Bird: Human-Robot Interaction in a Contemporary Arts Setting](#)''''''53:

David Rye, Mari Velonaki, Stefan Williams and Steven Scheduling

[Autonomous Pesticide Spraying Robot for use in a Greenhouse](#)''''''549

Philip J. Sammons, Tomonari Furukawa & Andrew Bulgin

## **Vision**

[Face and Pose Recognition for Robotic Surveillance](#)''''558

Karl B. J. Axnick & Ray Jarvis

[Toward Robust Image Detection of Crown-of-Thorns Starfish for Autonomous Population Monitoring](#)''''567

Ryan Clement, Matthew Dunbabin & Gordon Wyeth

[Texture and Distinctness Analysis for Natural Feature Extraction](#)''''''575

Kai-Ming Kiang, Richard Willgoss & Alan Blair

[RDRVision - Learning vision recognition with Ripple Down Rules](#)''''''582

Kim Cuong Pham & Claude Sammut

[Fast Global Reflectional Symmetry Detection for Robotic Grasping and Visual Tracking](#)''''''589

Wai Ho Li, Alan M. Zhang & Lindsay Kleeman

[Fast Posture and Object Recognition using Symmetries](#)''''598

Nathan Lovell

[Obstacle Detection using Optical Flow](#)''''''5: 4

Toby Low & Gordon Wyeth

[Panoramic Horizon Recognition](#)''''''5; 4

David Rawlinson & Ray Jarvis

[Is the Sun Too Bright in Queensland? An Approach to Robust Outdoor Colour Beacon Detection](#)''''''622

Ashley Tews, Jonathan Robert, Jonathan Roberts & Kane Usher