

Ross David Bencina

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Biography

Ross Bencina is a composer, performer, software developer and digital instrument maker, with a strong interest in improvised electroacoustic music. He has performed solo and with collaborators around Australia and internationally. He has recently performed at venues including Metrònom in Barcelona, The Zoo in Manchester, the Brisbane Powerhouse, and Performance Space in Sydney. In 2006 Ross performed in Brisbane, Sydney and Melbourne as part of the Liquid Architecture 7 festival. Since 2002, Ross and fellow composers Steve Adam and Tim Kreger have performed together as Simulus, an improvising electroacoustic ensemble. Ross is the creator of AudioMulch interactive music studio - software for electronic music performance. He is the founding developer of PortAudio, foundation software for real-time audio applications. Ross regularly gives presentations about his software and musical practice. He was a keynote speaker at the 2005 Australasian Computer Music Conference, and presented innovative AudioMulch developments at the 2005 New Interfaces for Musical Expression conference in Vancouver. Ross is a graduate of the La Trobe University Music Department (BA hons., 1995). In 2005, Ross completed one year as visiting researcher at the Music Technology Group, Pompeu Fabra University, Barcelona, where he contributed to the design and development of audio transformation technologies and musical instruments, including the reactTable* interactive music table. In October 2005, Ross was a resident artist at STEIM in Amsterdam, a major international centre for the research and development of instruments and tools for performers in the electronic performance arts. Ross spent most of 2006 year undertaking a major revision of his AudioMulch software, a project which received support from Arts Victoria and The Australia Council for the Arts. Ross currently holds an honorary position as visiting fellow with the Centre for New Media Arts at the Australian National University. Ross is the sole proprietor of Sonic Fritter Pty Ltd which sells AudioMulch and offers consulting and software development services for desktop and embedded audio applications.

Technical Role Summary

Core Competencies

- Analyse, specify and develop infrastructure and application software in ANSI/ISO C++ and C.
- Design and implement interactive direct-manipulation graphical user interfaces and digital audio signal processing systems.
- Develop Internet and multimedia applications in a team environment.
- Consult with clients to gather requirements, develop domain models, relational data models, object oriented designs, and total software solutions.
- Write technical documentation and develop API specifications in consultation with stakeholders.
- Participate in the full software development life cycle from inception through to design, implementation, and maintenance.
- Communicate with end-users to provide sales and technical support.
- Understand contemporary music practice, compose and perform live improvised electroacoustic music.

Career Highlights

- Designing and implementing music systems in a group of over forty researchers at the Music Technology Group, Barcelona.
- Playing a lead role in the design, specification and implementation of the PortAudio cross-platform audio API, and presenting this work to an international community of peers at the 2001 International Computer Music Conference.
- Designing, implementing, maintaining and supporting AudioMulch Interactive Music Studio.
- Traveling to Malaysia to deploy education kiosks at the National Science Center, Malaysia.
- Performing my music live around Australia and western Europe.

Tools and Techniques

Software Modeling and Design Techniques: Booch '94 based OOA/D methodology, UML, Design Patterns, Refactoring.

Programming Languages: ANSI C, ANSI C++, Borland C++ Builder / Delphi extensions, Java 1.1.x, Objective C, ANSI SQL, Visual Basic, VBScript / Active Server Pages, HTML, W3C DOM, XML, ANTLR parser generator, TCL, Python, Lua, ISO SAOL/SASL, Csound, AppleScript, Motorola 56000 series DSP Assembler, Motorola 68000 Assembler, Microchip PIC Assembler, Intel IA32 Assembler.

APIs and Protocols: ANSI C++ STL, Trolltech Qt 4, Borland VCL, Win32 including Winsock 2, Audio and Video for Windows, COM / ActiveX / ATL, DirectX (Audio), Berkeley Sockets, Scons build framework, Macintosh Toolbox, ImageMagick, Macromedia X-Tra SDK 6.0, Steinberg VST SDK Versions 1.0 and 2.x, Steinberg ASIO SDK 2.0, Opcode OMS SDK 2.0, ISAPI, MIDI.

Environments: Borland C++ Builder 1.0, 3.0 and 4.0, Microsoft Visual C++ 4.x, 6.0, 7.1 and 8.0, Microsoft Visual Basic 6.0, GNU C/C++ toolchain, Metrowerks Code Warrior C/C++, CVS, Macromedia Director 4.02, 5, 6, 6.5, 7, Macromedia Flash 3.0 and 4.0, Asymetrix Toolbook 1.53 and 4.0, Digidesign Pro Tools, AudioMulch, Adobe Illustrator, Adobe Audition.

Databases: SQL Server 7.0, Microsoft Access.

Operating Systems: Windows 95, 98, NT4.0 and XP pro, NEXTSTEP / BSD 4.3 Unix, MacOS 3.x to 8.x. and MacOS X, various Linux distributions.

Employment History (current roles)

Visiting Fellow: Centre for New Media Arts, the Australian National University.

April 2007 – present

I hold an honorary position as a Visiting Fellow with the Centre for New Media Arts. In this position I collaborate with faculty members at the Centre for New Media Arts and College of Engineering and Computer Science to investigate new applications of computing technology to musical and media arts performance.

Development Consultant: Audio Systems and Signal Processing Development.

October 2005 – present

Provide specialist consultation to a start-up company in California regarding implementation issues in the desktop audio domain. Developed signal processing algorithms.

[**Borland C++ Builder 4.0**]

Managing Director: Software Sales, Marketing, Support and Consulting Company. Sonic Fritter Pty. Ltd.

July 2000 – present

Direct company affairs and provide pre and post-sales service for over 2000 product licenses. Sonic Fritter Pty. Ltd. is a small business that provides software and consulting services in the desktop audio domain.

Software Architect: Cross-Platform MIDI Input/Output Plugin. Self managed project.

February 1999 – present

Designed and implemented a cross-platform Macromedia Director plugin. The plugin allows scripts to send and receive MIDI protocol messages using a set of high-level abstractions. Implemented the plugin in C++ for Win32 and Mac OS platforms. The plugin was based on an earlier prototype developed for Music Logic Interactive in 1998. Registered users of this plugin include Bose Corporation, and Line 6, who use the plugin to provide online patch downloads for their guitar effects products.

See <http://www.mediamacros.com/item/item-942071987>

[**Microsoft Visual C++ 4.x, Metrowerks Code Warrior C++**]

Senior Architect: Cross-Platform Real-Time Audio Input/Output Library. Open Source project.

December 1998 – present

Proposed an open source C language API to provide a cross-platform interface to platform specific real-time audio services. Coordinated analysis and design for the API in collaboration with an international group of peers. Developed a pilot implementation for the Win32 platform. Collaborated with co-designer Phil Burk of SoftSynth.com San Francisco to coordinate Open Source development of implementations for nine native APIs across five operating systems by over thirty contributing developers. Presented the API at an international conference of computer music professionals. Coordinated the review process and edited documentation for the first major revision of the API. See <http://www.portaudio.com>

[**ANSI C**]

Software Architect: Real-Time Interactive Musical Signal Processing Environment. Self managed project.

August 1997 – present

Architected, designed and implemented the AudioMulch real-time audio signal processing environment. Designed and implemented subsystems in C++ including: Synchronous dataflow synthesis engine, high performance multithreaded streaming I/O scheduler, audio DSP toolkit, software synthesis and signal processing components, custom GUI controls and infrastructure, XML based persistence, soundfile format parsing, and VST plugin hosting. Authored documentation and maintained the AudioMulch web site. See <http://www.audiomulch.com>

[**Borland C++ Builder 1.0 and 4.0, IA32 Assembler, XML**]

Employment History (past roles)

Developer: Tangible soundscape design system. Resonant Designs Pty Ltd

June 2006 – March 2007

Developed a tangible interface for soundscape design in collaboration with a sound designer and a researcher from Resonant Designs. The project implemented four different interactive environmental soundscapes which were trialed with patients in a palliative care context. Developed a Lua scripting language binding and interaction framework to bind input from the reactIVision tangible user interface platform to sound generation and processing algorithms in the AudioMulch software instrument.

[**Borland C++ Builder 4.0, Lua 5.1, reactIVision**]

Casual Lecturer: Sound design and production using AudioMulch. Box Hill Institute.

July – November 2006

Taught 13 2-hour workshop/seminars to a group of 8 undergraduate students in the Bachelor of Applied Music degree. Topics covered included: use of the AudioMulch software, sound design techniques, digital audio synthesis theory and electroacoustic composition.

Writer / Editor: User Documentation Editing. STEIM Foundation, Amsterdam

October 2005

Re-wrote a 45 page manual for the Junxion 2 product from original source material written by the primary developer, who was a non-native English speaker. Developed a more active style for the manual, improved expression and clarity. Consulted on the behavior of the software with the primary developer which led to some improvements in the software.

Research and Development Consultant: Systems Development. Audiovisual Institute, Popeu Fabra University, Barcelona, Spain.

September 2004 – September 2005

Developed new machine vision algorithms for generating, rendering and tracking printed markers in real-time video streams. Applied Genetic Algorithms on a cluster of Linux servers to optimise geometric properties of the markers. Implemented x@home-style wide-area workload distribution system in Python. Implemented high-speed binary image segmentation and pattern matching algorithm. Developed a framework for real-time spectral analysis and resynthesis of audio signals from an existing research model based on signal decomposition into sinusoidal tracks and residual noise. Developed cross-platform mixed client/server and peer-to-peer ad-hoc multicast networking middleware with NAT traversal to support distributed musical performances.

Developed proposals and musical events related to the 2005 International Computer Music Conference. Edited content for web sites and publicity materials. Conducted workshops on real-time music systems design and networked music systems.

[**Microsoft Visual C++ 2003, gcc, Python**]

Analyst / Programmer: Real-time Audio Recording and Playback System. Mobileer Inc.

June 2005

Developed real-time audio capture and playback software for "Time Piece Beacon," a permanent installation at Dia Beacon Museum, New York (opening May 2006).

[**gcc on Linux**]

Casual Lecturer: Audio Synthesis and Signal Processing. Master of Digital Arts, Popeu Fabra University.

April – June 2005

Presented eight two-hour seminars on sound synthesis theory and practical sound processing using computer software.

Analyst / Programmer: Win32 User-space USB Driver. Simulus.

February – May 2004

Developed a user-space driver library to communicate with a non-HID conforming virtual reality glove interface device. Ported packet decoding algorithms from an open-source Linux driver. Contributed suggestions during the development of similar code for Mac OS X.

[**Borland C++ Builder 4.0, GCC 3.2**]

Analyst / Programmer: Online Energy Quote and Connect Application. Mecca Medialight Pty. Ltd.
October – December 2003
Redeveloped a wizard style web application providing interactive quotes and connections. Established requirements and iteratively refined navigation structure in consultation with the client and project manager. Developed SQL and server-side validation and database glue code in Jscript. Interfaced with QAS postal address validation and normalization COM object. Wrote technical documentation.
[Microsoft SQL Server, QAS Quick Address Pro, JScript, DHTML]

Audio Systems Consultant: Real-time Multi-channel Audio System. Jumbo Vision International Pty. Ltd.
May 2003
Provided domain-specific advice and C++ code examples to a programmer developing a real-time multichannel audio system with PortAudio.
[Borland C++ Builder 4.0]

Software Engineer: Real-time Audio Looping Software. Contracted by vocalist Helen Thomson.
September 2002 – March 2003
Designed and implemented real-time audio looping components for AudioMulch in consultation with the client. The software records and plays multiple looping synchronised audio tracks, making it possible for a soloist to perform polyphonic music such as canons. Helen uses the software in her concerts.
[Borland C++ Builder 4.0]

Analyst / Programmer: Content Administration System. Mosbauer.
January – March, August 2003
Developed client-friendly news and pdf upload management system for a brochure-ware web site. Authored functional specification in consultation with project manager. Designed administration front-end including end-user documentation. Developed back-end scripts. Defined SQL schema and wrote queries. Interfaced with file upload COM component. See <http://www.mfvsoftware.com>
[Microsoft Access, Microsoft ASP]

Content Editor: Student Orientation CD-ROM. University of Melbourne, Faculty of Education.
November – December 2002
Reformatted approximately 100 pages of content from disparate sources into a HTML template supplied by a designer. Wrote Python scripts to partially automate the process.
[DHTML, Python]

Production Manager: Internet Development. Deep Technical Pty. Ltd.
November 2001 – January 2002
Managed production and maintenance of web projects for a number of major clients. Developed web content, directed one developer and one graphic artist. Reported to the General Manager.
[DHTML]

Tutor: Computer Science Marking. Monash University, Computer Science Department.
September – November 2000, October 2001, May – June 2003
Marked HCI (human computer interaction) assignments and exam papers, reporting to Jon McCormack, Senior Lecturer, Center for Electronic Media Art (CEMA).

Analyst / Programmer: Various Web Development Projects. 3 Deep Design Pty. Ltd.
March – August 2001
Developed HTML and back-end systems under contract to a graphic design firm. Developed and maintained user registration and content management databases for clients such as the Melbourne Fashion Festival and Arena Theatre (see <http://www.arenatheatre.com.au>). Optimised image files and HTML code for the Monash University home page.
[Microsoft Access, Microsoft ASP, DHTML]

Analyst / Programmer: Pittella Online Product Catalogue. 3 Deep Technical Pty. Ltd.
November – December 2000
Developed the back end system for an online product catalogue. Consulted with the client to develop a database schema. Built the database, wrote SQL queries and implemented a back end system in Microsoft ASP. Designed and implemented a programmatic interface which allowed the HTML developers to easily integrate the front end. Developed a data entry interface allowing the database to be populated by the client. See <http://www.pittella.com.au>
[Microsoft Access, Microsoft ASP, HTML]

Analyst / Programmer: URL Encryption Digest Generator. Web Page Design Pty. Ltd.
September 2000
Developed a COM object in C++ that generated HMAC encrypted digests of URL strings for use in conjunction with telstra.com's authentication infrastructure.
[Microsoft Visual C++ 6.0, ATL]

Software Architect / Consultant: Custom Audio/Video Sequencing System. Red House Editions Pty. Ltd.
January – September 2000
Designed, documented and implemented an application that allowed users to sequence video segments synchronised to a sound track. Consulted with the client to gather requirements, select an implementation platform and develop an object model. Implemented sequencing and editing infrastructure and a graphical user interface. The user interface included a disk-based waveform display Active-X control developed in C++.
[Microsoft Visual C++ 6.0 , Borland C++ Builder 4.0, Visual Basic 6.0, ATL, XML]

Software Engineer: Internet Explorer Browser Extension. OpenCore Pty. Ltd.
December 1999 – July 2000
Developed a browser extension for Microsoft Internet Explorer (versions 4 and 5) that provided a robust client-side interface to the client's content management system. The browser extension presented a GUI which synchronised with a HTTP server using a custom XML based protocol. Designed the XML based protocol in consultation with the client.
[Microsoft Visual C++ 6.0, ATL, XML, HTTP]

Analyst / Programmer: Management Performance Assessment System. E-Tech Services Pty. Ltd. for Barclays Bank U.K.
December 1999 – April 2000
Designed and implemented an intranet based performance assessment system in consultation with Team Publications Pty. Ltd. Brisbane. Conducted an intensive three-day requirements gathering, analysis and design workshop with Team Publications resulting in a data model, business logic and workflow specification and site design. Implemented the intranet site in Microsoft ASP and the database using Microsoft Access (later ported to SQL Server). Developed an ISAPI reporting module in C++ that dynamically generated Microsoft Word documents from the database.
[Borland C++ Builder 4.0, Microsoft ASP, Microsoft Access, SQL Server]

Analyst / Programmer: Online Image Database. E-Tech Services Pty. Ltd. for Sport The Library Pty. Ltd.
September – November 1999
Designed and implemented an internet based content retrieval system providing secure logged access to a database of print-quality images. Consulted with the client to gather requirements. Developed a server daemon in C++ to automatically synchronise the database with a client maintained file tree. The daemon generated thumbnail images and populated the database with metadata extracted from Photoshop specific fields in image files using the ImageMagick library. Developed a web interface to the image library and an ISAPI extension to provide secure access to over 15,000 high-resolution images.
[Borland C++ Builder 4.0, Microsoft ASP, Microsoft Access, SQL Server]

Software Developer: Various Multimedia Products. E-Tech Services Pty. Ltd.

April 1996 – November 1999

Developed web and CD-ROM-based educational content presentation applications. Designed and implemented user management interfaces, navigation and presentation frameworks, educational games, interactive courseware and simulation based tutorials.

Defined standards, wrote specifications and designed software interfaces that decoupled modules to facilitate parallel development. Integrated subsystems developed by co-workers. Developed content management systems supporting content delivery and incremental update using text based protocols over HTTP. Designed and implemented a Shockwave based user management and content delivery web client. Sourced, Edited and placed sound effects.

Developed a plugin in C++ to manage and display HTML content within Macromedia Director using Microsoft's Internet Explorer Active-X control. Developed a plugin in C++ to accelerate access to large volumes of text based content.

Developed products including: Ansett SAP R/3 training system, Dataworks online learning center, One Page Coach Advertising and Marketing CD-ROM, VicRoads "Road Smart" CD-ROM, Dataworks Spelling/Writing/Maths Adventure CD-ROMs, Fraud Prevention CD-ROM prototype, "Humphrey B. Bear" CD-ROM.

[Microsoft Visual C++ 4.x, Microsoft ASP, Macromedia Director 4.0 to 7.0 PC & Mac, Asymetrix Toolbook 4.0CBT]

Hardware / Firmware Developer: Analog to MIDI Interface. Contracted by composer Newton Armstrong.

April – July 1999

Produced a custom hardware interface to convert analog sensor signals into a low bandwidth MIDI protocol serial data stream. Designed and fabricated circuit boards comprising a PIC microcontroller, ADC and supporting circuitry. Developed firmware for the PIC microcontroller in assembly language.

[Microchip PIC Assembly Language]

Analyst / Programmer: Interactive Introduction to SAP R/3. Quoin Technology Pty. Ltd.

September 1998 – January 1999

Designed an interactive tutorial system to introduce employees to a newly installed SAP R/3 system. Consulted with the client to gather requirements. Designed and implemented a framework facilitating the rapid construction of simulation based tutorials for various SAP tasks. Implemented a pilot tutorial using the framework in collaboration with an animator.

[Macromedia Director 6.5 PC]

Analyst / Programmer: MIDI Input/Output Plugin. Music Logic Interactive Pty. Ltd.

October – November 1998

Developed an interface specification for a Macromedia Director plugin in consultation with the client. The plugin provided bidirectional communication with MIDI (Musical Instrument Digital Interface) hardware and software devices. Implemented the plugin in C++ under Mac OS using the Opcode OMS (Open Music System) 2.0 SDK.

[Metrowerks Code Warrior C++, Macromedia Director 6.5 Mac]

Sound and Video Engineer: for "Diversity" stage production by Warren Burt. Dancehouse, Carlton.

June 1998

Operated electronic music, audio, and video systems during a series of performances by composer and performance artist Warren Burt.

Software Engineer: "Ex-Static" Eight Channel Audio Spatialiser.

Contracted by composer Terrence McDermott.

April – May 1998

Designed and implemented a real-time multi-channel sound diffusion system. The system allowed multiple soundfiles to be streamed of hard disk and diffused to an array of 8 independently addressed loudspeakers using programmable diffusion trajectories. The system was deployed as a public installation at the Next Wave festival.

[**Borland C++ Builder 1.0**]

Software Developer: Computer Aided Courseware. University of Melbourne, Department of Biochemistry.

June 1996 – March 1998

Developed and maintained an intranet courseware system for the Melbourne University Biochemistry Department. Implemented a tool to parse and convert existing text-based content into a windowed presentation system. Content consisted of text, graphics and assessment materials (multiple choice, and free form text answers). Implemented a network based student usage and assessment system. Developed a CD-ROM version of the courseware system.

[**Asymetrix Toolbook 1.53**]

Software Engineer: Real-time Audio Mixing Module. Isotope Pty. Ltd.

December 1997 – February 1998

Developed a C module implementing high-performance audio mixing routines. The module was incorporated into the client's audio diffusion system, which has since been installed in a number of international facilities.

[**Borland C++ Builder 1.0**]

Kitchenhand: Graduate House, 224 Leicester St. Carlton. March - September 1997

Sound design: Theatre Production "Marat - Sade". La Trobe University, Drama Department.

January – March 1997

Sourced, sampled, and programmed digital sound effects for playback as part of a theatre production.

Programmer and Sound Designer: Various Multimedia Projects. The Purple Group Pty. Ltd.

June – November 1996

Developed interactive marketing and education projects for clients in the commercial and government sectors.

[**Macromedia Director 5.0 Mac, Digidesign ProTools**]

Sound Designer and Programmer: "Baxter the Dragon" CD-ROM Prototype. Wooden-i Multimedia Pty. Ltd.

February – August 1996

Developed sound effects and musical atmospheres for a children's education product.

[**Macromedia Director 5.0 PC & Mac**]

Sound Designer and Programmer: Various Multimedia Projects. MAGIANmultimedia Pty. Ltd.

February 1995 – January 1996

Developed various interactive multimedia projects including 15 touch screen kiosks for the National Science Center, Kuala Lumpur, Malaysia. Spent two weeks on site in Kuala Lumpur customizing and deploying software.

[**Macromedia Director 4.0 Mac & PC, Digidesign ProTools, SoundEdit16**]

Sound Designer and Programmer: "What's for Dinner Thankyou!" Antarctic Food Chain CD-ROM.

Champion Productions Pty. Ltd.

December 1994

Recorded, edited and placed sound effects for a children's CD-ROM. Developed a plugin (XCMD) in C to bulk-convert sound effects to a different format.

[**Macromedia Director 4.0 Mac, Think C, SoundEdit16**]

Developer: Miscellaneous Audio Software. Self managed projects.

1993 – 1995

Developed freeware audio software, some of which continues to be used by musicians internationally. This software includes: overSYTE (1995) a real-time audio signal processor for Mac OS that can process files and real-time audio input; NeXTgrainer (1994) a real-time sinusoidal granular synthesiser for NEXTSTEP with DSP code written in Motorola 56k assembly; CurveControl (1993-95) a graphical control signal editor for Mac OS. See <http://www.audiomulch.com/~rossb>

[ANSI C, ANSI C++, Objective C, Motorola 68000 and 56000 Assembler]

Publications

Bencina, R. & Kaltенbrunner, M. (2007) "reactIVision: A Computer-Vision Framework for Table-Based Tangible Interaction," *Proceedings of the First International Conference on Tangible and Embedded Interaction (TEI'07)*, Baton Rouge, pp. 69 – 74.

Bencina, R. (2006) "Creative Software Development: Reflections on AudioMulch Practice," *Digital Creativity*, 17(1), pp. 11 – 24, Routledge.

Bencina, R. & Kaltенbrunner, M. (2005) "The Design and Evolution of Fiducials for the reactIVision System," *Proceedings of the Third International Conference on Generative Systems in the Electronic Arts (Third Iteration)*, Melbourne, pp. 97 – 106.

Jordà, S. Kaltенbrunner, M. Geiger, G. & Bencina, R. (2005), "The reactTable*," *Proceedings of International Computer Music Conference 2005*, Barcelona, pp. 579 – 582.

Bencina, R. (2005) "The AudioMulch Process – Software development in musical practice," *Proceedings of the Australasian Computer Music Conference*, Brisbane, pp. 7 – 9. (keynote address)

Bencina, R. Kaltенbrunner, M. & Jordà, S. (2005) "Improved Topological Fiducial Tracking in the reactIVision System," *Proceedings of the 2nd IEEE International Workshop on Projector-Camera Systems*, San Diego.

Bencina, R. (2005), "The Metasurface – Applying Natural Neighbour Interpolation to Two to Many Mapping," *Proceedings of the 2005 Conference on New Instruments for Musical Expression (NIME'05)*, Vancouver, pp. 101 – 104.

Kaltенbrunner, M. Bovermann, T. Bencina, R. & Costanza, E. (2005) "TUIO: A protocol for table-top tangible user interfaces," *Proceedings of The 6th International Workshop on Gesture in Human-Computer Interaction and Simulation*, Vannes.

Bencina, R. (2004), "Implementing Real-Time Granular Synthesis". In Greenbaum & Barzel (Eds), *Audio Anecdotes III*, ISBN 1-56881-215-9, A.K. Peters, Natick. *In press*.

Bencina, R. & Burk, P. (2004), "PortAudio - An API for Portable Real-Time Audio". In Greenbaum & Barzel (Eds), *Audio Anecdotes*, ISBN 1-56881-104-7, A.K. Peters, Natick, pp. 361-368.

Burk, P., Greenbaum, K. & Bencina, R. (2004), "PABLIO: A Simple Audio I/O Library". In Greenbaum & Barzel (Eds), *Audio Anecdotes*, ISBN 1-56881-104-7, A.K. Peters, Natick, pp. 351-360.

Bencina, R. (2003), "Some Notes Regarding Instrument Building in Performance," *Electronic Music Performance Symposium, Institute of Modern Art – Brisbane*, pp. 12-14.

Bencina, R. (2003), "PortAudio and Media Synchronisation". In *Proceedings of the Australasian Computer Music Conference*, Australasian Computer Music Association, Perth, pp. 13-20.

Bencina, R. & Burk, P. (2001), "PortAudio - an Open Source Cross Platform Audio API," *Proceedings of the International Computer Music Conference, Havana*, International Computer Music Association, pp.263-266.

Bencina, R. (2001) "Two Recent Electroacoustic Releases – a review of two CDs: 'Travels of the Spider' from Argentina and 'Presence II' from Canada," *Chroma – Newsletter of the Australasian Computer Music Association*, Issue 30, April 2001, pp. 6-9.

Bencina, R. (2000), "The Decomposing Interface - Reflections on the Development of Musical Software," *Chroma - Newsletter of the Australasian Computer Music Association*, Issue 28, June 2000, pp. 5-6.

McDermott, T. & Bencina, R. (1999), "The exstatic Project - an Experiment in Electroacoustic Presentation," *Proceedings of the Australasian Computer Music Conference*, Wellington, New Zealand, pp. 40-47.

Bencina, R. (1998), "Oasis Rose the Composition - Real-Time DSP with AudioMulch," *Proceedings of the Australasian Computer Music Conference*, ANU Canberra, pp. 85-92.

Riddell, A. & Bencina, R. (1996), "Cmix on non-UNIX platforms," *Proceedings of the International Computer Music Conference – Hong Kong University of Science and Technology*, Hong Kong, pp. 263-265.

Bencina, R. (1995), "Curve Control: A time varying parametric editor," *Proceedings of the Australian Computer Music Association Conference*, Melbourne University, Melbourne, pp. 141-143.

Bencina, R. (1994), "Dynamic Parametric Representations in Computer Music," *Chroma - Newsletter of the Australasian Computer Music Association*, Issue 17.

Presentations, Seminars, Workshops and Technical Reports

Workshops: "AudioMulch practice and techniques," in conjunction with Liquid Architecture 7 and the Australasian Computer Music Conference: Brisbane: Queensland University of Technology, July 3 & 4, Sydney: Performance Space, July 9, Adelaide: University of Adelaide, July 14, Melbourne: SIAL Sound Studios, RMIT, July 17 2006.

Artists Talk: "Software Development Processes, Creative Practice," Third International Conference on Generative Systems in the Electronic Arts (Third Iteration), Monash University, Caulfield, Australia, December 1, 2005.

Workshop: "AudioMulch Interactive Music Studio." STEIM, Amsterdam, October 26, 2005.

Invited Seminars: "AudioMulch: composer developed software for improvisation and composition," presented to: Composition and Technology students, Sydney Conservatorium of Music, Wednesday 28 July, 2004; Department Seminar, University of Wollongong, July 29, 2004; 2nd and 3rd Year Music Technology Students, University of Western Sydney, July 30, 2004; Sonology Seminar, Escola Superior de la Musica Catalonia (ESMuC), Spain, January 12, 2005; Informatics Students, Pompeu Fabra University, Barcelona, June 13, 2005; 3rd Year Music Technology Students, Hogeschool voor de Kunsten Utrecht, The Netherlands, October 20, 2005; Public artists talk, STEIM foundation, Amsterdam, October 25, 2005; 2nd Year Music Technology Students, Queensland University of Technology, Creative Industries, 2006.

Invited Seminar: "Creative Software Development and the AudioMulch Process," 3rd Year Music Technology Students, Hogeschool voor de Kunsten Utrecht, The Netherlands, October 20, 2005;

Panel Session: "Free software to free sound," International Computer Music Conference, Barcelona, September 6, 2005. With Xavier Amatriain, Miller Puckette, Nicola Bernadini, Angus Hewlett, Fernando Lopez-Lezcano and Gregory Taylor.

Workshop: "Real Time Systems Concepts for Computer Music," International Computer Music Conference, Barcelona, September 4, 2005. With Roger Dannenberg.

Workshop: "Networked Music," International Computer Music Conference, Barcelona, September 4, 2005. With Alvaro Barbosa, Jason Freeman and Scot Gresham-Lancaster.

Panel Session: "Uso masivo de la técnica y de los medios de producción. ¿Software de código abierto o no?," Escena Electrónica, CCCB, Barcelona, April 21, 2005. With Günter Geiger.

Workshop: "The Future of Music Software," Music Technology Group and S2S², Barcelona, January 28, 2005. With Miller Puckette, Roger Dannenberg, George Tzanetakis, and Xavier Amatriain.

Workshop: "Introduction to Audiomulch," 2nd year Sonology class, Escola Superior de la Musica Catalonia (ESMuC), Spain, January 13, 2005.

Workshop: "Star Gazing: Future Technological Developments for Music," Ausmusic Forum, Melbourne, May 21, 2004. With Steve Adam & Jeremy Yuille.

Workshop: "Introduction to Patching Workshop - Building Blocks to Mathematics," Electrofringe, Newcastle, October 3, 2003. With Casey Rice, Daniel Heckenberg, Donna Hewitt, Luke Collison & Nigel Kersten.

Invited Seminar: "AudioMulch as a Sound Design Tool," Upper Pool Design Studio, School of Architecture and Design, RMIT, August 28, 2002. With Lawrence Harvey.

Workshop and performance: "Using AudioMulch," Ghent Session #1, Frans Ackermanstraat 7, 9000 Gent, Belgium, October 7, 2001. See also <http://www.ghentsessions.be/>.

Invited Seminar: "The Design and Architecture of AudioMulch," Audiovisual Institute, Pompeu Fabra University, Barcelona, Spain, October 4, 2001.

Invited Seminar: "Introduction to Audiomulch," Igualada Municipal Music School, Catalonia, Spain, October 3, 2001. Translated by Josep Comajuncosas.

Workshop: "Programming Computers for Musical Sound," Electrofringe 2000, Newcastle, October 5, 2000.

Workshop: "Introduction to AudioMulch," Electrofringe, Newcastle, October 3, 1999. With Jarrod Smith & Vincent Johnson-Bade.

Technical Report: "DIY MIDI Controllers using PIC Microcontrollers and Basic Stamps," self published, March 1999, <http://www.audiomulch.com/midipic>

Presentation: "The AudioMulch System," Next Wave Computer Music Workshop, Australian National Academy of Music, Melbourne, May 20, 1998.

Published Musical Works

"Mary Antonita (cosmic radiation remix)," Remix. on Plink :: Thank You For Waiting :: Remixes, Wordclock Records, 2006.

"Why are you so stupid?," Tape piece. on Anthology of Australian Electroacoustic Music Vol. 2. (CD), ANU / Australian Music Center, 1996.

Performed Musical Works (premieres only)

Mulchwerk: Solo improvised Kraftwerk covers/remixes, Clan Analog Hump!, Horse Bazaar, Melbourne, April 18, 2007.

Mulchwerk: Solo improvised Kraftwerk covers/remixes, Exile on Smith St, Fitzroy, March 29, 2007.

Mulchwerk: Solo improvised Kraftwerk covers/remixes, Outpost #7, Horse Bazaar, Melbourne, March 23, 2007.

Mulchwerk: Solo improvised Kraftwerk covers/remixes, Horse Bazaar, Melbourne, March 6, 2007.

Solo electroacoustic improvisation, ACMC'06, Elder Conservatorium, Adelaide, July 12, 2006.

Solo electroacoustic improvisation, Ear Poke, Jade Monkey, Adelaide, July 11, 2006.

Solo electroacoustic improvisation, Liquid Architecture 7, Performance Space, Redfern, July 8, 2006.

Solo electroacoustic improvisation, Liquid Architecture 7, Powerhouse, Brisbane, June 30, 2006.

Solo electroacoustic improvisation, Make It Up Club, Bar Open, Fitzroy, November 22, 2005.

Solo electroacoustic improvisations, Dutch Mulch Convention, OT301, Amsterdam, October 27, 2005.

Solo electroacoustic improvisation, Kraakgeluiden, OT301, Amsterdam, October 24, 2005.

Solo electroacoustic improvisations (two concerts), Queensland Music Festival, The Loft, Brisbane, July 16, 2005.

Solo electroacoustic improvisation, Showskills 4, The ZOO, Manchester, June 4, 2005.

Solo electroacoustic improvisation, Phonos electroacoustic music series, Metronom, Barcelona, January 27, 2005.

Solo electroacoustic improvisation, 1/4 Inch, Frequency Lab, Sydney, July 29, 2004.

Solo electroacoustic improvisation, All-Mulch special event, plug & play, Kent St Bar, Fitzroy, June 24, 2004.

Jon Rose's Australia Adlib Improvising Big Band, "Yes it's Political" Make-it-up Club, Planet Cafe, Fitzroy, February 17, 2004.

Solo electroacoustic improvisation, Friends of Mulch, Lambsgo Barr, Fitzroy, March 3, 2003.

Solo electroacoustic improvisation. Make-it-up Club, Planet Cafe, Fitzroy, August 28, 2001.

"Dreamscape Resonances", Solo electroacoustic improvisation. Autonomic – Auricle New Music Concert, Public Office, Melbourne, February 23, 2001.

"Ad hoc Mulch", Solo electroacoustic improvisation. Sonic Residues Concert, Australian Centre for Contemporary Art, Melbourne, November 24, 2000.

"Koto Loops", Solo electroacoustic improvisation. Electrofringe 2000 dance party, Newcastle, October 7, 2000.

"The Solo Instrumental Music of Cambodia", Solo electroacoustic improvisation. Centrifugal Experimental, Mercat Hotel, Melbourne, April 28, 2000.

"Three Animals for Cello and AudioMulch", Live electroacoustic improvisation with Zoe Barry, Auricle New Music Concert, Lion Arts Center, Adelaide, November 25, 1999.

"No Noise Is Good Noise?", Tape piece. Auricle New Music Concert, Lion Arts Center, Adelaide, November 25, 1999.

Solo Improvisations at *Sqjital* and *Test Pattern* dance parties. Electrofringe '99 mutant media festival, Newcastle, October 1 & 3, 1999.

"Angelfire", Tape piece. Seraphim Trio New Music Concert, Adelaide Art Gallery, August 8, 1999.

"Rosetta Fragment #1", Cor Anglais, Marimba and real-time DSP, Australasian Computer Music Conference, Canberra School of Music, July 11, 1998.

"Oasis Rose", Live electroacoustic improvisation. Cor Anglais, Viola, Marimba and AudioMulch. Next Wave contemporary music series, South Melbourne Town Hall. May 28 & 29, 1998. Broadcast on ABC Classic FM, 29th July 1998.

"Scattered to The Wind", Tape piece. Next Wave contemporary music series, South Melbourne Town Hall. May 20 & 21, 1998.

"Improvisation VII" with Flautist Kylee Smith, Electroacoustic improvisation. Concert and direct to air broadcast on ABC Classic FM, May 29, 1996.

"As a Dancing Bear...", Live improvised electroacoustic work with Kylee Smith. Adelaide fringe festival, March 8 - 10, 14 - 16, 1996.

"Improvisation II", Live electroacoustic improvisation with members of the Astra Chamber Choir. Astra new music series, Meat Market, North Melbourne. October 3, 1995.

"By Rivers Edge", Tape piece. Astra new music series, Meat Market, North Melbourne. October 3, 1995.

Performances with Simulus Improvising Electroacoustic Ensemble

June, 2007, Australasian Computer Music Conference 2007, The Australian National University, Canberra.

May 23, 2007, (07 CD Launch) Horse Bazaar, 397 Little Lonsdale Street, Melbourne.

October 25, 2006, Outpost @ Horse Bazaar, 397 Little Lonsdale Street, Melbourne.

July 15, 2006, Liquid Architecture 7, North Melbourne Town Hall

July 5, 2006, Glitch bar + cinema, 318 St Georges Rd, North Fitzroy

March 2, 2006, Plug & Play, Kent St. Cafe, 201 Smith Street, Fitzroy.

August 14, 2004, Glitch bar + cinema, North Fitzroy.

July 3, 2004, Australasian Computer Music Conference 2004, Victoria University of Wellington, New Zealand.

May 22, 2004, Glitch bar + cinema, North Fitzroy.

May 4, 2004, Make It Up Club, BAR OPEN, 317 Brunswick St Fitzroy.

April 8, 2004, Plug & Play, Kent St. Bar, Fitzroy.

December 9, 2003, Make It Up Club, The Planet Cafe, Fitzroy.

October 5, 2003, This Is Not Art / Electrofringe 2003, Newcastle Workers Club

July 6, 2003, Australasian Computer Music Conference 2003 Western Australian Academy of Performing Arts.

March 17, 2003, Articulating Space, Footscray Community Arts Centre

Conferences and Workshops Attended

ANAT WearNow Symposium, a forum for critical discourse around wearable futures, National Museum of Australia, Canberra, Australia, 2 – 3 February, 2007.

Australasian Computer Music Conference 2006 (ACMC), Elder Conservatorium of Music, University of Adelaide, Adelaide, Australia, 11 – 14 July, 2006.

Third International Conference on Generative Systems in the Electronic Arts (Third Iteration), Monash University, Caulfield, Australia, November 30 – December 2, 2005.

Trolltech Developer Days 2005, including Qt 4 application development training course, Munich, Germany, November 2 – 3, 2005.

International Computer Music Conference 2005 (ICMC), Barcelona, Spain, September 5 – 9, 2005.

Australasian Computer Music Conference 2005 (ACMC), Queensland University of Technology, Brisbane, Australia, 12 – 14 July, 2005.

IEEE International Workshop on Projector-Camera Systems (PROCAMS 2005), San Diego, USA, June 25, 2005.

IEEE Computer Society International Conference on Computer Vision and Pattern Recognition (CVPR 2005), San Diego, USA, June 20 – 25, 2005.

2005 Conference on New Instruments for Musical Expression (NIME'05), University of British Columbia, Vancouver, Canada, May 26 – 28, 2005.

The Future of Music Software Workshop, Universitat Pompeu Fabra, Barcelona, Spain, January 28, 2005.

5th International Conference on Music Information Retrieval (ISMIR 2004), Audiovisual Institute, Universitat Pompeu Fabra, Barcelona, Spain, October 10 – 14, 2004.

Australasian Computer Music Conference, Victoria University of Wellington, New Zealand, July 1 – 3, 2004.

Australasian Computer Music Conference, Edith Cowan University, Western Australia, July 5 – 7, 2003.

Australasian Computer Music Conference, RMIT, Melbourne, July 6 – 8, 2002.

International Computer Music Conference, Havana, Cuba, September 17 – 22, 2001.

First Iteration – a conference on generative systems in the electronic arts, Monash University Caulfield, Melbourne, December 1 – 3, 1999.

Australasian Computer Music Conference, Australian Center for the Arts and Technology, Canberra, 10 – 12 July, 1998.

Next Wave Computer Music Workshop presented by Curtis Roads, Australian National Academy of Music, Melbourne, May 18 – 22, 1998.

International Computer Music Conference, The Banff Center for the Arts, Banff, Canada, September 3 – 7, 1995.

Australian Computer Music Conference, University of Melbourne, Melbourne, June 9 – 11, 1995.

Australian Computer Music Conference, Australian Center for the Arts and Technology, Canberra, July 1 – 3, 1994.

Academic Record

B.A. Hons. (Music Technology), La Trobe University, 1995.

V.C.E. Melbourne High School, 1991.

Grants and Residencies

New Work / New Media grant from The Australia Council for the Arts (with Alistair Riddell) to develop new performances utilising handheld computers, swarm networking and data exchange with audience mobile devices. (2007)

Artist in Residence at STEIM Foundation, Amsterdam. (October – November 2005, July 2007).

Practice development grant from Arts Victoria to further develop the AudioMulch software instrument and new improvised musical works (2006).

Sounding Out instrument building grant from The Australia Council for the Arts to further develop the AudioMulch software instrument. (2006-2007).

Arts Development grant from Arts Victoria for Simulus' project to develop software and performance techniques interfacing USB virtual reality gloves to real-time music software. (2003)

Other Experience

Web Officer, Australasian Computer Music Association (2006 – 2007)

Membership Officer, Australasian Computer Music Association (2003 – 2004)

Public Officer, Australasian Computer Music Association (2000 – 2002)

Chorister, Astra Chamber Choir (1994 – 1996)

Associate Editor of *Chroma*, newsletter of the Australasian Computer Music Association. (1994 – 1996)

Secretary, Australasian Computer Music Association (1994 – 1995)

Macintosh Sound and Music software adviser, Apple Users Society of Melbourne Inc. (1989 – 1994)

References

Available on request.