

# Bernard Cena, BSc (Hons), PhD

## Name and Address

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## Personal Details

Date of birth: 23 December 1970  
Place of birth: Nottingham, England  
Nationality: British, Australian and Polish citizen  
Languages: English and Polish (fully bilingual); German (good conversational);  
French, Russian and Spanish (reading comprehension)  
Marital status: single

## Profile

Independent research and development consultant - 2 years after graduating with a PhD in computer science with a signal processing and data analysis focus. Software design and development experience spans 14 years, 8 years of research and 2 years of project management. Able to work collaboratively or independently on projects requiring novel approaches using the latest technology. Experienced in all aspects of software design, prototyping, development, testing and documentation under all major platforms.

## Recent Highlights

- In October, 2002, completed a two-year consultancy with a New York based multimedia company. Designed, managed and developed new video analysis technology integrating with a multimedia analysis, synthesis and search system, which is awaiting patents and commercialisation.
- Since September, 1997, operating as an independent consultant involved in image and video processing, machine vision and Internet technology projects.
- In April, 2001, graduated with a PhD in wavelet signal processing applied to data analysis, filtering, detection, reconstruction and visualisation.

## Expertise

- Practical and theoretical experience in various modes of signal processing and data analysis; expert in multi-resolution analysis and wavelet signal processing; advanced knowledge of data analysis, mathematical and statistical modelling and visualisation; applications in image and video processing, medical data analysis, oceanographic and meteorological systems and computer vision
- Management of projects and supervision of staff, design, research, development, optimisation, verification of complex software systems (real-time and off-line)
- Specialist in wavelet and multi-resolution signal processing methods after completing a PhD in this area as well as using these methods in advanced applications

## Professional Skills

- 14 years of experience in software development on a variety of software and hardware platforms as a researcher and software designer, and 2 years of experience as a project manager
- Software development cycle under Unix (Linux, Solaris), Windows (95, 98, ME, NT, 2000, XP) and MacOS (X) in ANSI C/ObjC/C++, Java, assembly code for Motorola and Intel processors; various scripting (Perl, shell); version control, testing and self-documentation systems; prototyping and modeling systems (MATLAB, Mathematica)
- Extensive knowledge of multimedia, networking, web technologies, database systems, multi-processing, data analysis and acquisition, real-time and embedded systems

## Academic Qualifications

- 1994-2000 The University of Western Australia, **PhD** –  
Doctor of Philosophy in Computer Science,  
Dissertation title: “Reconstruction for visualisation of discrete data fields using  
wavelet signal processing”. Degree awarded in April 2001.
- 1995 The University of Western Australia –  
One-year university level German language course
- 1989-1993 The University of Western Australia, **BSc (Hons)** –  
Bachelor of Science with First Class Honours in Computer Science and  
Information Technology
- 1988 Corpus Christi College, Perth, Australia – Certificate of Secondary Education

## Memberships

- Member of the IEEE (The Institute of Electrical and Electronics Engineers) and IEEE Computer Society (1994- ) and the ACM (1996- ) – professional, international computing organisations
- Member of the Burns in Western Australia Research Group, Princess Margaret and Royal Perth Hospitals (1994- )
- Member of the Robotics and Vision Research Group at The University of Western Australia (1994- )
- Alumni member of the Ship for World Youth – international youth affairs and cultural exchange program

## Employment

### May '00 – Oct '02: Consultant to Tomandandy Music Inc, New York, NY, USA

- design, research, development and management of video analysis and processing technology for integration with a sophisticated multimedia system

This work was contracted to my own company based in Perth, Australia (Bernard Cena and Associates) and involved independent conceptual and practical development of new video analysis and classification algorithms for multimedia applications including automatic editing, synchronisation of video and audio events and multimedia searching and cataloguing. The results of the analysis are similar to the MPEG-7 multimedia description standard. The video analysis work was done entirely by myself with supporting staff that I supervised in Perth, Western Australia, and the results were later integrated in collaboration with Tomandandy software specialists based in New York.

The Tomandandy Inc. project occupied over 2 years full-time. The contract included a confidentiality clause. The project has now been completed and the results are in the process of commercialisation.

### Sep '97 – May'00: Consultant to Visionary Systems Pty Ltd, Perth, WA, Australia

- member of a team of consultants developing solutions in the areas of Internet computing and machine vision. Projects were done on a part-time or short term full-time basis.

## Projects:

- machine vision system for quality control of manufactured LEDs
- machine vision system for quality control of packaged biscuits
- expert system for analysis of results from chemical spectroscopy
- Internet chat system using Java clients and a C++ server
- Java game used for product advertising
- various Internet applications developed in Java, JavaScript and Perl

### Apr '94 – Jun '02: Industry Mentor and Computer Science Tutor at the University of Western Australia and Murdoch University, Perth, Western Australia

- industry mentor for the final year Professional Computing course
- guest lecturer at fourth year Data Visualisation course

- tutored and supervised (part-time) first, second and final year Computer Science and Engineering students in object oriented, procedural, functional and machine level programming as well as mathematical modelling and computer graphics

**May '96 – Dec '96: Visiting Researcher at the Fraunhofer Institute, Darmstadt, Germany sponsored by a grant from Deutscher Akademischer Austauschdienst (DAAD)**

- studied and worked in the Department of Cognitive Computing and Medical Imaging with Professor Georgios Sakas and his colleagues
- conducted research in wavelet signal processing methods applied to ongoing projects in image processing, medical imaging and surface reconstruction
- this visit lead later to PhD work on wavelets

**Dec '89 – Dec '95: Consultant to WeatherNews International, Perth, Australia**

- consulted on oceanographic data processing, analysis and visualisation; projects involved real-time control and data acquisition from meteorological instruments as well as further data analysis and processing

**Projects:**

- development of software for data acquisition from meteorological instruments, intermediate processing stages, advanced data analysis, visualisation and presentation
- development of software to automate processing and analysis of ocean current data gathered from sites on the North-west shelf at various depths
- development, implementation and testing (off and on-site) of a real-time system for acquisition and analysis of meteorological, wave and platform motion data on the BHP Jabiru oil platform on the North-West Shelf

**Awards and Scholarships**

Jan '97 – Mar '97	member of the Australian delegation to the Ship for World Youth, a Japanese government sponsored worldwide program promoting cultural exchange and cooperation among youth of the world
May '96 – Dec '96	Recipient of Deutscher Akademischer Austauschdienst (DAAD) scholarship to undertake study at the Fraunhofer Institute, Darmstadt, Germany with Prof Georgios Sakas and his Department of Cognitive Computing and Medical Imaging
Apr '94 – May '98	Recipient of the Australian Postgraduate Award (APA)

**Other Interests**

- Global youth affairs – I'm a senior alumni member and Australian organiser of the Ship for World Youth organisation
- Music – composition and performance on piano, harmonica and didgeridoo
- Sports – volleyball, cross-country cycling, trekking and snow skiing

## References available on request

### Publications

- Bernard Cena, "Searching for wavelets among visualisation filters". In proceedings of *International Conference on Computer Vision and Graphics*, Zakopane, Poland, September, 2002.
- Bernard Cena, "Function reconstruction and its derivative computation from discrete fields using the Lifting Scheme". In proceedings of *Tenth University of Western Australia Computer Science Research Conference*, pp. 9-18, Mandurah, Australia, April, 2000.
- Bernard Cena, "Wavelets: from the discrete to the continuous". In proceedings of *Ninth University of Western Australia Computer Science Research Conference*, pp. 9-14, Mandurah, Australia, September, 1998.
- Bernard Cena and Nick Spadaccini, "A wavelet based data visualisation system". In proceedings of *1997 Departmental Research Conference*, pp. 37-41, Yanchep, Australia, April, 1997.
- Bernard Cena and Nick Spadaccini, "Wavelet shrinkage of ultrasound data". In proceedings of *Summer School on Wavelets*, pp. 11-18, Zakopane, Poland, August, 1996.
- Fiona Wood, Kris Currie, R Bruce Backman and Bernard Cena, "The current difficulties and the possible future directions in scar assessment". In proceedings of *International Symposium for Hypertrophic Scarring*, Hong Kong, May 1995; also published in *Burns, Journal of the International Society for Burn Injuries*, Butterworth-Heinemann, UK., Vol. 22., No. 6, pp. 455-458, 1996.
- Bernard Cena, R Bruce Backman, Kris Booth, Fiona Wood, "Image processing techniques for building an objective scar quality assessment tool". In *Handbook of the Australian and New Zealand Burn Association's 21th Annual International and Regional Congress*, Adelaide, Australia, August, 1996.
- Bernard Cena, R Bruce Backman, Kris Booth, Fiona Wood, "Computerised integration of multimodality imaging in scar assessment". In *Handbook of the Australian and New Zealand Burn Association's 20th Annual International and Regional Congress*, Gold Coast, Australia, August, 1995.
- R Bruce Backman, Bernard Cena, Fiona Wood, "Scientific visualisation as an aide to quantifying the extent of the burn injury". In *Handbook of the Australian and New Zealand Burn Association's 20th Annual International and Regional Congress*, Gold Coast, Australia, August, 1995.