CURRICULUM VITAE

Richard Philip Taylor

Physics Department, University of Oregon
Eugene, Oregon, 97403-1274, USA

Fax:+1 541 346 5861
Tel: +1 541 346 4741 (work)
Tel: +1 541 485 5900 (home)
email: rpt@darkwing.uoregon.edu
Website: http://materialscience.uoregon.edu/taylor/taylor.html

Contents:

16th December 2003

1. SUMMARY

Nationality	AUSTRALIAN
Date of Birth	12th September 1963
Research Summary	Publications: 167 Recent funding (1995-2003): US$4,535,823

Education/Qualifications

2004	D.Sc., University of Nottingham, U.K.
2000	Masters, Art Theory, (First Class with Honours) College of Fine Arts (COFA), University of New South Wales (UNSW), Australia
1995	Certificate of Art and Design (Distinction) Manchester School of Art, Manchester, U.K.
1989	Chartered Physicist, Institute of Physics, U.K.
1988	Ph.D. in Physics, University of Nottingham, U.K.
1985	B.Sc. Physics (First Class with Honours) University of Nottingham, U.K.

Appointments/Positions

1999-present	Associate Professor, Physics Department Elected Member of the Materials Science Institute University of Oregon (UO), USA
2003	Adjunct Professor, Psychology Department Elected Member of the Institute of Cognitive and Decision Sciences UO, USA
2003	Adjunct Professor, Art Department, UO, USA
2003	Consultant, International Foundation for Art Research, USA
2001-present	Consultant, Eco-Integrations Inc., USA
2000	Visiting Professor, School of Physics, UNSW, Australia
1999-2000	Head of Condensed Matter Physics Department School of Physics, UNSW, Australia
1995-2000	Queen Elizabeth II Research Fellow, Australian Research Council School of Physics, UNSW, Australia
1994-1995	Visiting Researcher, Manchester School of Art, U.K.
1993-1996	Visiting Researcher, National Research Council, Ottawa, Canada
1993-1994	Research Associate, National Pulsed Magnet Laboratory UNSW, Sydney, Australia
1993	Visiting Research Consultant, Frontier Research Programme RIKEN government laboratories, Tokyo, Japan
1990-1992	Research Associate, National Research Council, Ottawa, Canada
1988-1990	Research Fellow, Science and Engineering Research Council (SERC) Glasgow and Nottingham Universities, U.K.
1985-1988	Teaching Assistant, Nottingham University, U.K.

2. CAREER EXPERIENCE AND ACHIEVEMENTS

Research Leadership, Funding and Awards

• I have developed successful research projects based in Australia, Canada, the UK and the USA, including the scientific and financial management of 11 international collaborations. I head the Fractals Research Laboratory at UO, which currently includes 9 research students.

• I have a record of successful research funding throughout my career, attaining financial support from funding agencies in 5 countries. These include the Australian Research Council (Australia), the Department of Education, Employment, Training and Youth Affairs (Australia), the Department of Industry, Science and Technology (Australia), the Science and Engineering Research Council (UK), the British Royal Society (UK), the Engineering and Physical Sciences Research Council (UK), the National Research Council (Canada), The Japanese Science and Technology Agency (Japan), the Frontier Research Programme (Japan), the National Science Foundation (USA), the US Navy (USA) and the Research Corporation (USA).

• My research projects have received more than AUS$1.5million from Australian funding agencies.

• Fellowship awards include the prestigious Research Corporation Cottrell Scholarship, USA, (12 awarded from 112 applicants in 2003), a research residency for the Pollock-Krasner society, USA (2001), a Queen Elizabeth II fellowship, Australia, (1995-2000) and a SERC fellowship, UK, (1988-1990). I was awarded an honorary membership of Sigma Xi Research Society (the oldest research society in the USA) in 2002 in recognition of my inter-disciplinary research on the human visual system.

• My 14 travel awards include financial support from the Guggenheim Foundation (2004), the Royal Swedish Academy (2003), the Sigma Xi Research Society (2001), the Advanced Telecommunications Research Institute of Japan (2001), the Nobel Foundation (2000), the British Royal Society (1994), the Japanese Frontier Research Programme (1993), NATO (1989) and a Kilby Scholarship (1987).

Publications and Writing

• My 167 publications span 18 years. These include 123 refereed papers (in journals such as *Nature, Science, Physical Review Letters* and *Leonardo*) and 20 invited publications (book chapters, review articles and contributions for journals and magazines such as *Nature, Science, Scientific American, New Scientist, American Scientist, Physics World*). In addition to my 167 publications, I have authored a further 39 papers/ extended abstracts in unpublished conference proceedings.

• In recognition of my inter-disciplinary research, I was commissioned by *Science* to write an article about my inter-disciplinary career in 2001.

• As an indication of my status within the fractals research community, I was asked to write the announcement of the Proctor Prize in 2002, awarded to Benoit Mandelbrot (the founder of fractal geometry).

• Congressman Peter DeFazio's office contacted me in December 2002 to personally congratulate me on my *Scientific American* article. The editors of *Scientific American* nominated me for the American Institute of Physics Science Writing Award (2003).

• I was invited to write a scientific description for the caption of the Jackson Pollock painting at the Tate Gallery (London) (2003). This is part of a series called "The Bigger Picture", in which prominent "experts" describe the importance of selected famous paintings.

• I am writing a book on the fractal concepts used in my current research.

• My work has also been the subject of 41 articles by other scientists and science journalists in journals and magazines etc (e.g. *Nature, Science, New Scientist, Physics World, Physics Today, Discover*).

• My work has been reviewed by journalists in national newspapers in Australia *(Sydney Morning Herald, Canberra Times)*, the UK (e.g. *The Times, Guardian, Independent, Daily Telegraph)*, USA *(Boston Globe, The Oregonian)*, Canada *(National Post)*, Sweden (*Svenska Dagbladet*,) and France (*Liberation*).

• My work has featured in key research books by prominent researchers (e.g.*Transport in Nanostructures* by D. Ferry and S. Goodnick, *Introduction to Quantum Chaos* by K. Nakamura and T. Harayama, *Quantum Chaos in Quantum Dots* by K. Nakamura and T. Harayama, and *The Encyclopedia of Non-linear Science* by A. Scott), popular science books (e.g. *Quantum Technology* by G. Milburn, *Introducing Fractal Geometry* by Lesmoir-Gordon et al, *Fractals, Graphics and Mathematics Education* by M. Frame and B. Mandelbrot) and an undergraduate text book (*Calculus* by R. Larson *et al*).

Media Coverage/Communication of Science and Art

• My research has received significant attention from television and radio media. I was the subject of a 30 minute national TV science programme ("Quantum", Australian Broadcasting Company, May 1998) and played a central role in the theme development and in writing the narration. New York Times Television (National Geographic, USA) and Horizon (BBC, UK) contacted me recently to discuss potential programmes based on my current research. I also give regular interviews on radio programmes in the UK, USA and Australia (14 in the past 5 years).

• I am a regular speaker at international conferences. For the period 2000-2004, I have been asked to present 13 invited talks (e.g. The International Conference of the Society of Chaos in Psychology and the Life Sciences, Boston, USA, 2003), 9 keynote addresses (e.g. the 2001 Sigma Xi Research Society Forum, USA), 2 banquet speeches (e.g. the Nobel Foundation Symposium on Quantum Chaos in Sweden, 2000) and 2 contributed talks. Reflecting the broad impact of my work, these invitations came from a diverse range of researchers (physicists, electrical engineers, chaologists, mathematicians, psychologists, architects and artists) and countries (USA, UK, Japan, Australia, Sweden, Germany, Brazil, Spain, France and Italy).

• I have been commissioned by a diverse range of societies such as the Australian Museum (1998), the Australian National Art Gallery (1999, 2001), The Pollock-Krasner House, USA (2001), the Phi Beta Kappa and Sigma Xi Research Societies, USA (2001), and the Guggenheim Museum in Venice (2004) to give public lectures. These lectures involve audiences of up to 650 people.

• Benoit Mandelbrot has presented my Pollock results in a public lecture. My work has also been presented by other public lecturers (e.g. at the British Association for the Advancement of Science meeting in 2000, reviewed in *Nature*).

• I am a member of a high profile, international team of scientists/artists (including Cliff Pickover and Michele Emmer) who will present art shows at prestigious venues (e.g. The Boulder Museum of Contemporary Art and The Denver Museum of Contemporary Art) in 2005, designed to communicate the close relationship between mathematics and art aesthetics to the public.

• My research is the subject of undergraduate lectures at other universities eg. "Art and Physics", Physics Department, Hong Kong University, "Complexity", Philosophy Department, Xavier University (USA) and "Aesthetic Computing", University of Florida (USA), and "Math in The Art Curriculum", the Mathematics Department, Connecticut College, USA.

Consultancy

- My expertise in fractals, chaos and non-linear science has been used by a diverse range of institutes, including the Prince of Wales Hospital (Sydney, 1999), the Sydney Police Force (Sydney, 1999), Eco-Integrations Inc. (USA, 2001-2003), the Hawaii Center For Learning Science Through Art (USA, 2001), The Wasserman New York Art Gallery (USA, 2002).

- I lead a scientific team that advises the International Foundation for Art Research (IFAR) (USA, 2003). This is the official organisation for authenticating art works of major artists. My decisions in this role can have significant financial impact, with the potential to change a painting's value by up to US$40M. IFAR's invitation to serve in this capacity reflects my status as a leading international expert in pattern analysis.

- I was a scientific advisor for the team of architects that designed the initial phase of the $1.2M clean room facility at UNSW (1994).

Professional Activities, Including Conference Organisation, Editorial Boards etc

- I was identified as an international expert by the Australian Academy of Sciences in 2003 and participated in the Australian Nanotechnology Benchmarking Project (2003). I have also reviewed grants/programmes for the Australian Research Council, the Guggenheim Foundation (USA), the Fulbright Programme (USA) and the Research Corporation (USA).

- I am a member of the editorial board for the new journal *Chaos and Complexity Letters.*

- I have reviewed articles for the following publications: *Nature*, *Physical Review Letters*, *Nanotechnology*, *Surface Science*, *Applied Surface Science*, *Leonardo*, *Chaos*, and *the Journal of Non-linear Dynamics, Psychology and Life Sciences*.

- I was a member of the organizing committee for the "5th International Conference on the Interdisciplinary Study of Symmetry", Sydney 2001.

- I was an invited member of the Sigma Xi and Phi Beta Kappa "Intersections in Science and Humanities Research" panel (USA, 2001). I am also an invited member of the "Art and Complexity" panel for the upcoming Science and Literature Conference in Paris (2004).

- I was Head of the Condensed Matter Physics Department at UNSW (in charge of 9 academic staff) during 1999-2000. For the past 2 years at UO, I have been an elected member of the Personnel Committee, in charge of important issues such as promotions, tenure etc.

- I am an elected Chartered Physicist and a member of the Institute of Physics (U.K.), the American Physical Society, the American Association for the Advancement of Science and the Society for Chaos in Psychology.

Teaching

- I have taught a wide spectrum of undergraduate and graduate courses, with class sizes up to 230 students. Recent courses I have taught include Quantum Mechanics, Modern Physics, Electrostatics, Magnetism, Physics of Light and Color and General Physics. A recent evaluation by students gave me a rating of 9.7 out of 10 (where 5 is the UO average rating).

- I hold a US$75,000 scholarship to develop courses to communicate science to arts students.

- I helped to develop a Materials Science PhD programme at UO and serve on the committee that administers the associated US$2,759,000 grant.

- Recent supervision (1995-2003) includes 2 post-doctoral associates, 6 Ph.D. students, 4 Masters students and 12 undergraduate students. This includes physics, psychology and art students.

3. RESEARCH DESCRIPTION: BACKGROUND TO FEDERATION PROPOSAL

"Interdisciplinary Investigations and Applications of Human Perceptual and Physiological Responses to Fractal Patterns"

A spectacular variety of natural patterns are fractal, including coastlines, clouds, trees, rivers and mountains. Fractals are referred to as a new geometry because their visual properties are distinctly different from the more traditional, Euclidean shapes such as triangles, squares and circles. Whereas these artificial shapes are composed of smooth lines, fractals are built from patterns that recur at increasingly fine magnifications, generating shapes of immense complexity.

Fractals clearly constitute a novel test-bed for visual studies, with the reward of providing an enhanced understanding of our perception of natural environments. However, despite their prominence in our daily visual experiences, relatively little rigorous research has explored the human visual system's response to fractals. The goal of my Federation Fellowship is to achieve a comprehensive understanding of the visual system's relationship to fractals, and how this affects critical aspects of human physiology and behaviour.

Building on the increasing role of biophysics and pattern analysis in visual science, the proposal is fundamentally inter-disciplinary. Holding professorships in physics, psychology and art, I am in a unique position to pursue this research. In response to my inter-disciplinary work, *Science* commissioned me to write a career essay in 2001 [149] and I was awarded the prestigious Cottrell Scholarship in 2003. During the past 6 years, my research has appeared in prominent journals such as *Nature* [145, 153, 154], *Physics World* [142, 147], *New Scientist* [143] and *Scientific American* [156, 160] (the numbers refer to Section 6).

The project falls within the Australian Research Council's research priority area of "promoting and maintaining good health," specifically "preventative healthcare." The ARC emphasizes the need for collaborative, inter-disciplinary methods for meeting this challenge. Featuring an inter-play between pure and applied research, the proposal is highly innovative:

Primary aim: To couple physics research of the statistical qualities of fractal environments with the *first comprehensive, inter-disciplinary study* of human perceptual and physiological responses to fractals. These include physiological stress, oculomotor and neurological responses.

Secondary aim: To develop the *first inter-disciplinary project* to design building interiors and exteriors based on these perceptual and physiological responses to fractals. Fractal patterns will be designed to maximise these responses while minimising the practical challenges of incorporating fractals into buildings. Strategies include the analysis and application of fractal art.

Broad impacts:

The proposal addresses central aspects of vision - a fundamental and critical component of human life. Advances in fundamental research will lead to significant national social and environmental benefit.

• Fundamental research: The project will add a high profile and unique component to Australia's internationally-renowned research of vision.

• Inter-disciplinary collaboration: The project will pool the expertise of a number of research disciplines at UNSW while maintaining strong links with my US collaborators. The proposal is supported by John Storey (head of Physics), Peter Lovibond (head of Psychology), Ian Howard (Dean of COFA), Brien Holden (Director, Cooperative Research Centre for Eye Research and Technology), Peter Murphy (Dean, Faculty of the Built Environment) and Simon Gandevia (Scientific Director, Prince of Wales Medical Research Institute). I will establish a UNSW programme similar to the *Brain, Biology and Machine Initiative*, a highly successful inter-disciplinary project at UO that recognises the growing role of physics within vision research.

• Social benefit: Physiological stress is recognized as a major health risk for modern society. The project builds on my recent experiments with NASA demonstrating that exposure to fractals can reduce the observer's physiological stress. The project will also investigate the use of fractal patterns to enhance work performance involving cognitive tasks and memory.

• Environmental and economic benefit: Integration of fractals into built environments holds significant potential for commercial development. I currently serve as a consultant for the US company "Eco-Integrations" and I will explore commercial development of this project with Australian companies.

Background

In 2000, I formed the Fractals Research Laboratory at the University of Oregon (UO). Fractals have a profound impact on a diverse range of research fields and my laboratory adopts an inter-disciplinary research approach to address fundamental questions about fractals and related non-linear processes such as chaos and complexity. The research is conducted in collaboration with laboratories in Australia, New Zealand, Sweden, Japan, the USA and the UK.

My current research focuses on two main fields. One project builds on my 18 year background in nano-scale electronic devices. I investigate why the electrical and optical properties of these devices become chaotic, generating fractal fluctuations in the device transmission characteristics. The devices offer a novel, controlled environment for studies of fractal behavior, attracting considerable interest from the fractals research community. Based on my recent research, the fractal fluctuations are also predicted to dominate the functionality of certain categories of future nano-scale electronics. The work therefore represents a fascinating inter-play between fundamental and applied science. My work defines the leading international effort in the study of fractal fluctuations and has appeared in prestigious journals such as *Nature*, *Science*, *Physical Review Letters* and *Applied Physics Letters* [for recent publications see, for example, 117, 118, 127, 128, 136, 139].

Whereas the above project investigates artificially-generated fractals, my primary research project focuses on the visual properties of natural fractals. This work builds on my 12 years of physics research of fractals, my art theory background in fractal aesthetics and my collaborations with visual perception psychologists. The project was triggered by my discovery that the drip paintings of the prominent modern artist Jackson Pollock are fractal, raising the question of whether fractals possess fundamental visual appeal [152, 158]. This work was the subject of the Australian TV programme *The Art of Science* (Quantum) in 1998 and, when published in *Nature* in 1999 [145], prompted over 350 email and telephone discussions in the first week alone. This remarkable interest from both academics and the public has continued, with *National Geographic* (USA) and the *BBC* (UK) contacting me to discuss my current research.

Previously based at UNSW, my research of the visual properties of fractals builds on successful collaborations with the Schools of Physics and Psychology, the Prince of Wales Medical Research Institute and COFA. I also collaborate with the School of Psychology and the Department of Architectural and Design Science at the University of Sydney. Working closely with researchers in the physics, psychology, art and computer science departments at UO, my current projects couple physics research of the visual properties of fractals with experiments that investigate human perceptual and physiological responses to these properties. To conduct this research at UO, I use facilities within *The Institute for Cognitive and Decision Sciences* and the US$50M *Brain, Biology and Machine Initiative.*

Proposed Research

i) Perceptual Responses

Whereas traditional visual perception studies of natural scenery employ vague descriptions such as "naturalness", this project investigates the relationship between subjects' perception of nature's patterns and their fractal properties. The project builds on my experiments that demonstrated the clear potential of this approach [145, 161, 165, 166]. In particular, my experiments (based on a

forced choice method where subjects chose between a pair of images displayed on a monitor) revealed that the fractal properties of natural objects dominate their perceived visual qualities such as aesthetics. Furthermore, the fractal characteristics required for high visual appeal are 'universal', in the sense that they are the same for patterns generated by nature, by humans and by computers.

These preliminary experiments concentrated purely on the effect of the pattern's fractal dimension D (a parameter that quantifies the fractal scaling properties). The visual properties of nature's fractal scenery are, however, remarkably subtle [166] and future studies will systematically examine a range of fractal parameters and their roles in influencing subjects' perception of the patterns. For example, many natural patterns are multi-fractal, where D provides the framework for a spectrum of other dimensions. Additional parameters such as the lacunarity and the Lyaponov exponents also impact on the pattern's visual properties. Furthermore, typical natural scenes contain several distinct fractal objects (eg clouds, trees, mountains etc). My preliminary analysis of natural scenery [166] raises central questions such as whether the fractal characteristics of individual objects are more important than those of the combined pattern of the scene, and whether patterns based on luminance gradients are more important than those based on colour.

I will investigate how the various fractal parameters affect subjects' abilities to differentiate between, and express aesthetic preferences for, different fractal patterns. To establish whether the results are 'universal', a library of images will be employed, featuring fractals generated by nature, humans (using art works) and computers. Subjects from different age groups (including infants) and different environments (e.g. urban versus rural habitation) will be used. I will also investigate correlations between preference, perceived "naturalness" and the abundance of the preferred fractals in natural environments. Having identified the perceptual responses to fractal patterns, the final step will be to determine the degree of 'fractality' required to induce these responses. This will include the use of mathematically-generated patterns in which the magnification range of fractal scaling is adjusted.

ii) Physiological Stress Responses

My perception experiments revealed a distinct aesthetic preference for fractals with mid-range D values. Using skin conductance experiments performed at NASA's Ames Research Laboratory (USA), my follow-up investigations [156, 166] showed that exposure to fractals with mid-range D values also significantly reduced the observer's physiological responses to stressful cognitive work. In this experiment, subjects performed a sequence of stress-inducing cognitive tasks such as arithmetic problems, with each task separated by a one-minute recovery period. During this sequence, skin conductance (a well-established technique for quantifying mental performance-induced stress) was continuously monitored and the amount of stress induced by mental work was quantified by the mean increase in skin conductance ΔG between the rest and work periods. When subjects were exposed to mid-D fractal patterns, ΔG was reduced by 44% compared to exposure to a white control image [166].

This is a profound result. Whereas NASA's interest in these experiments was to explore methods of maintaining low physiological stress for astronauts during space flight (a central motivation of the National Space Biomedical Research Institute), stress-reduction is of enormous benefit to society in general. Based on these results, incorporation of mid-range D fractal patterns into interior and exterior environments could be used to reduce physiological stress levels, particularly in situations where people are deprived of nature's fractals – for example, in windowless environments.

Since D is just one of a number of fractal parameters required to quantify the full visual characteristics of a fractal pattern (see above), future research will be aimed at identifying the *precise* fractal parameter ranges required to induce this striking physiological response. A comprehensive study using natural, computer and human-generated fractal images will couple the physiological measurements with the perception studies of Section (i). Strategies to enhance the physiological response will include varying the size and number of observed fractal images, along

with increasing the observation times. The response to static fractal images will also be compared to sequences in which the fractal images evolve with time.

Future experiments will adopt the above approach of measuring the physiological response to stress-inducing cognitive tasks. In addition to investigating electrodermal response, I will investigate other physiological indicators, including electrocardiograms, pulse activity and pupillography. I will simultaneously investigate if exposure to the fractal patterns also enhances subjects' ability to perform mental tasks involving memory and arithmetic.

iii) Oculomotor Responses

Because of their repetition at different magnifications, fractal shapes exist at course and fine size scales. Eye movements are required for the visual system to detect the range of pattern sizes that build up the fractal character. Eye-movements become even more important for observing a scene featuring a number of fractal objects. Consequently, eye-tracking experiments are central to developing an understanding of how the visual system assesses the fractal character of natural scenery.

Traditional eye-tracking experiments show that the eye searches for regions of high detail. How, then, does the eye respond to fractal scenery, where the repeating patterns at different magnifications build detail on many size scales? I am currently using eye-tracking facilities to measure saccadic eye motions as subjects look at fractal images with different D values. My preliminary experiments show that, although the eye does not follow the individual features of the observed fractal pattern precisely, the eye's motion trajectory is nevertheless fractal (interestingly, the micro-saccades are also fractal but with a different dimension). This demonstrates a remarkable ability of the eye's motion to accommodate the intricate structure of the observed fractal. Future eye-tracking experiments will start with specific questions. If the observer looks at equally complex non-fractal patterns, can the eye follow these patterns as effectively as the equivalent fractal patterns? If the observer looks at a blank screen, is the eye motion still fractal? These investigations will incorporate fractal analysis of: i) the fixation distributions, ii) the trajectory patterns and iii) the trajectory size distributions. A correlation analysis will quantify deviations between the eye motion and the underlying image.

This eye motion analysis is aimed primarily at assessing the eye's inherent ability to detect the fractal character of natural scenery. The results will also be applied to improving human performance during "search tasks". A central theme of oculomotor studies concerns the trajectories mapped out by the eye when searching for information embedded within a visually complicated scene. If this can be determined, then in situations where people are required to comprehend intricate visual scenes (for example, in aircraft cockpits featuring many visual displays) the information can be arranged in a pattern that is optimal for the eye's natural search mechanisms. My recent preliminary research indicates that the eye follows fractal "Levy" trajectories, which are known in mathematics to cover space efficiently. Search times could therefore be improved by arranging visual information in a distribution that most closely matches the eye's natural fractal trajectory.

Whereas these experiments are designed to aid extraction of information, other proposed experiments are designed at hiding information. Eye tracking will be used to see if the eye can detect one set of fractal patterns embedded in a background fractal pattern, with the idea of assessing if fractal patterns can be used as camouflage.

iv) Neurological Reponses

Image processing performed in the visual regions of the brain constitutes a vital component of the way in which the visual information of a scene is 'understood'. In this regard, the human visual system appears to be well-suited to the detection of fractal objects. The spatial information in a scene is thought to be processed within a 'multi-resolution' framework where the cells in the visual cortex of the brain are grouped into so-called 'channels' according to the spatial frequency they detect. The way these 'channels' are distributed in spatial frequency parallels the scaling relationship of the fractal patterns in the observed scenery. Beyond this fact, however, little is

known about the role of image processing in determining the fractal characteristics of the observed environment.

One of the great advances in studies of vision has been the use of non-invasive, high resolution imaging techniques to investigate the function of the brain while the observer is subjected to controlled visual stimuli. Experiments using the functional magnetic resonance imaging (fMRI) facility at UO are being planned to examine the neurological response to viewing fractal patterns. If the Federation proposal is successful, it is anticipated that fMRI at the Prince of Wales Medical Institute will also be used.

Using simple Euclidean shapes (such as lines, circles, triangles and squares) as visual stimuli, it is well-established that visual qualities such as color and motion are processed in separate visual centres of the brain. However, not all regions surrounding the primary visual cortex are understood in terms of their visual functionality. Although a challenging task, it is acknowledged that an empirical charting of the regions activated by different stimuli will constitute a major step toward understanding the brain's visual organisation.

Within this context, it is an important step to determine which regions of the visual brain are activated when observing fractal patterns. Benoit Mandelbrot, the researcher who introduced the concept of fractals, emphasized that fractals represent a new geometry, one with very different visual qualities to artificial Euclidean shapes. Because of the distinct visual form of fractals, it has been speculated that different regions of the brain are involved when processing their visual character. This intriguing possibility will be investigated by contrasting the neurological responses to smooth Euclidean lines and lines featuring embedded fractal structure. The number of size scales of embedded fractal structure will be varied to test if the activated regions of the brain evolve as the pattern assumes an increased fractal character (this will be performed in conjunction with the perception studies of Section i).

v) Fractal Designs

A secondary aim of my research is to explore the possibility of incorporating fractals into the interior and exterior of buildings, in order to adapt the visual characteristics of artificial environments to the above responses. Potential applications are diverse and include both military and civil applications. I currently pursue this research as a consultant for "Eco-Integrations Inc."

I first presented my concepts of adapting building exteriors in *Nature* [153], where I discussed the fractal character of Frank Gehry's architecture. My investigations of fractal architecture differ from traditional approaches in two vital respects: 1) whereas many discussions of fractal architecture focus on stylistic concerns (e.g. 'the return to Gothic principles') [164], I will investigate the potential of fractal architecture to induce specific, well-studied perceptual and physiological conditions in the observer, 2) I will determine the fractal patterns that both maximize this response and satisfy the practical limitations presented by constructional considerations.

Perception experiments will utilize computer-simulated images of fractal buildings against fractal and non-fractal backgrounds. Practical strategies include the patterning of building exteriors (using paintwork, lighting or attached facades) to merge the building's profile with background fractal scenery (see the discussion of fractal camouflage in Section iii). One practical factor to be investigated concerns the magnification range over which the pattern must follow fractal behavior in order to induce the desired response in the observer (see Section i). Also, to what degree can shapes deviate from fractal behaviour and still induce the desired response? For example, even though the Sydney Opera House is not strictly fractal, the pattern created by simple shapes at several size scales might be sufficient to mimic fractals. My initial perception results indicate that relatively simple (low D) fractals spanning a limited magnification range (25) are sufficient to induce a marked aesthetic preference, demonstrating that fractal architecture is a practical proposition.

For interior environments, I will explore the use of fractal patterns to reduce physiological stress (see Section ii) [166]. To pursue this research, I will adopt the increasingly popular concept of

using art works to investigate the visual system (a number of people, including myself, gave talks on this subject at the conference "The Art of Seeing and the Seeing of Art" at the Australian National University in 2001. See also my piece in *Nature* [154]). I will examine the methods used by artists to incorporate fractals into art forms [166]. I have already demonstrated the power of this approach with my research of Jackson Pollock. A remarkable number of artistic, architectural and archeological works have potential to be fractal. As an example, Australian Aboriginal dot paintings are among the works that will be analysed. Crucially, a static image may not be sufficient to maintain the effectiveness of the artwork: it might be necessary to use flat-screens to present fractal patterns that evolve with time. This project requires a combination of scientific and artistic considerations, and will be carried out in a collaboration with COFA.

4. RECENT TALKS (1999-2003)

In addition to seminars and colloquia, the following is a selection of recent talks to international audiences:

1. "Fractals, Human Vision and Art"
   May 1999, Public Lecture, National Gallery, Canberra, Australia
2. "The Science and Engineering of Nano-electronics"
   2nd April 1999, Materials Science Institute, Oregon, USA
3. "Semiconductor Billiards: a Controlled Environment to Study Fractals"
   Invited talk
   Nobel Foundation Symposium on Quantum Chaos,
   13th-17th June 2000, Backaskog Castle, Sweden
4. "Chaos, Fractals and Art"
   Banquet Speech
   Nobel Foundation Symposium on Quantum Chaos,
   13th-17th June 2000, Backaskog Castle, Sweden
5. "Quantum Chaos in Nanostructure Semiconductor Devices"
   Invited talk
   International Workshop on the Applications of Quantum Chaos
   Advanced Telecommunications Research Institute International
   November 2000, Chiba, Japan
6. "Universal Scaling Behavior of Electrical Currents in Nanostructure Devices"
   Invited talk.
   International Workshop on "Breakthrough for New Quantum Transport Devices"
   June 13th 2001, Chiba University, Japan
7. "Visual Perception Studies of Fractals"
   Invited talk.
   The 5th International Conference on the Interdisciplinary Study of Symmetry
   8th-14th July 2001, Sydney, Australia
8. "Fractal Expressionism: The Science of Jackson Pollock's Drip Paintings"
   Public Lecture
   Pollock Krasner Lecture Series,
   5th August 2001, The Pollock-Krasner Study Center, New York, USA
9. "The Art, Science and Psychology of Fractals"
   Keynote speaker
   The 2001 Sigma Xi Research Society Forum
   8th November 2001, Raleigh, North Carolina, USA
10. "Intersections in Research Between the Arts and Sciences"
    Panel member,
    The 2001 Sigma Xi Research Society Forum
    8th November 2001, Raleigh, North Carolina, USA
11. "Visual Perception Studies of Fractals"
    Invited talk

The International Conference on the Art of Seeing and the Seeing of Art
5th –7th December 2001, Canberra, Australia

12. "Visual Complexity"
Invited talk
The International Conference on Complexity
10th –14th June 2002, Nashua, New Hampshire, USA

13. "Fractal Conductance Fluctuations in Single and Double-layer Semiconductor Billiards"
Contributed talk
The 26th International Conference on the Physics of Semiconductors"
29th July – 2nd August 2002, Edinburgh, UK

14. "Generic Fractal Behavior of Ballistic Devices"
Invited talk
The 2002 Conference on Optoelectronic and Microelectronic Materials and Devices"
11th -13th December 2002, Sydney, Australia (presented by my colleague R. Newbury)

15. "Geometry Independence of Fractal Ballistic Processes"
Contributed talk,
Nanomes 2003,
February 2003, Tempe, USA

16. "Complexity"
Invited talk, The Royal Swedish Academy workshop on "Science as Art"
March 17th-20th, 2003, Abisko, Sweden.

17. "Fractals – From Nanostructures to Modern Art"
Keynote and Banquet address, (I declined this invitation)
Workshop on The Fundamentals of Nanostructures,
6-13th July 2003, Strasbourg, Germany

18. "Perceptual and Physiological Response to the Visual Complexity of Fractals"
Invited talk,
International Conference of the Society for Chaos in Psychology and Life Sciences,
8-10th August 2003, Boston, USA

19. "Fundamental Constants"
Series of 3 Keynote lectures, (I declined this invitation)
Workshop on Metrology, International Center for Condensed Matter Physics,
22-26th September 2003, Brasilia, Brazil

20. "Fractal Architecture: Impact on the Observer"
Keynote lecture,
The First International Conference on Fractal Foundations For 21st Century Architecture and Environmental Design
4-5th March 2004, Madrid, Spain

21. "Fractals in Art: From Da Vinci to Pollock"
Public lecture,
26 March 2004, Guggenheim Museum, Venice, Italy

22. "Nature, Mathematics and the Art of Seeing"
Keynote lecture,
International Conference on Mathematics and Culture,
26-28th March 2004, Venice, Italy

23. "Fractal Aesthetics"
Keynote lecture,
Factors in Human Factors Design Symposium
1st June, 2004, Albuquerque, USA

24. "Art and Complexity"
Invited panelist,
International Conference on Science and Literature
26-29th June 2004, Paris, France

25. "Fractal Expressionism: The Mathematics of Fractals"
Keynote lecture,

International Conference on Art and Mathematics
2-5th June 2005, Boulder, USA

5. RECENT RESEARCH FUNDING (1999-2003)

I have a record of high research funding throughout my career, involving financial support from funding agencies in 5 countries. In particular, my research projects have received over AUS$1.5M from Australian funding agencies. Recent research funding totals US$4,535,823 (1995-2003). Below is a list of grants used to fund my research during the period 1999-2003.

1. "Low Temperature Investigation of AlGaAs/GaAs Nanostructures"
   Australian Research Council QEII Fellowship Grant, AUS$50,000 for 1995-2000

2. "Fractal Behaviour in Many Electron Semiconductor Billiards"
   With R. Newbury
   Australian Research Council Large Grant, AUS$268,000 for 1998-2000

3. "Quantum Chaos in Advanced Semiconductor Devices and Optical Fibre Interferometers"
   With T.M. Fromhold
   Engineering and Physical Sciences Research Council Grant (UK), AUS$149,893 for 1999

4. "High Pressure Studies of Low Dimensional Semiconductor Systems at Low Temperatures"
   With R. Newbury and J. Cadogan
   Australian Research Council Small Grant, AUS$20,000 for 1999

5. "Asymmetry of the Electrical Conduction in Mesoscopic Devices - Quantum Ratchets"
   With H. Linke, R. Newbury and P. Omling
   Australian Research Council Small Grant, AUS$25,000 for 1999

6. UNSW Equipment/Research Grants
   With R. Newbury and J. Cadogan
   3 grants totaling AUS$11,229 for 1999-2000

7. "Electron Quantum Ratchets based on Semiconductor Nanostructures"
   Associate Investigator, with H. Linke and R. Newbury
   Australian Research Council Large Grant, AUS$131,000 for 2000-2002

8. Nobel Foundation award US$2,000 for 2000

9. “Fractals in Nanoelectronics”,
   Materials Science Institute, USA, US$340,222 for 2000-2007

10. Advanced Telecommunications Research Institute International award
    US$2,000 for 2000

11. Nano-Hana Travel Award, Japan, US$2,000 for 2001

12. Sigma-Xi Research Society Award US$1,000 for 2001

13. “Chaotic Transistors”
    Bradley Scholarship Award, US$3,000 for 2001-2

14. “The Fractal Properties of Submicron Semiconductor Devices”
    Associate Investigator, with R. Newbury
    Australian Research Council International Researcher Exchange Scheme,
    AUS$33,700 awarded for 2001-2003

15. “Doctoral Training at the Interface of Chemistry and Physics: New Materials for Electronics and Optics Through Control of Nanoscale Structure”
    Co-author of block grant awarded to the Materials Science Institute,
    National Science Foundation IGERT Grant
    US$2,700,002 awarded for 2001-2006

16. “Doctoral Training at the Interface of Chemistry and Physics: New Materials for Electronics and Optics Through Control of Nanoscale Structure”
    With H. Linke and M. Haley

National Science Foundation IGERT grant, International Supplement
US$59,000 awarded for 2002-2006

17. "Quantum Electronic Materials and Devices"
US Navy grant awarded to collaborators at Lund University (Sweden) for $900,000 (2002-2005) to fund collaborations between European and US research groups. Within this grant my laboratory was identified as one of eight US "nodes."

18. Cottrell Scholar Award, (CS1082), Fractals in Human Vision and Nanostructures
Research Corporation, US$75,000 for 2002-2007

19. "Oregon Partnership to Enhance Science, Technology, Engineering and Mathematics Education"
National Science Foundation, GK12 Grant, $560,841 2203-2006. I am a named researcher on this grant, which is used to fund one of my graduate students for US$30,000 per year.

20. "Fractal Conductance Fluctuations in Electronic Nanostructures"
With H. Linke
National Science Foundation,
This grant was placed in the "Fund if Funds Available" category in 2003 and a revised version was submitted in November 2003 for US$233,648 (2004-2007)

21. "Perceptual Response to Fractal Patterns"
To be submitted to the National Science Foundation, December 2004.

6. PUBLICATIONS (1985-2003)

i) Nano-device Research

1. "Angular Dependence of Magnetoresistance Fluctuations in Submicron n^+GaAs Wires"
P.C. Main, L. Eaves, **R.P. Taylor**, G.P. Whittington, S. Thoms, S.P. Beaumont and C.D.W. Wilkinson
Proceedings of The 18th International Conference on the Physics of Semiconductors, Stockholm, 1986
Published: World Scientific Press 1591 (1986) (REFEREED)

2. "Universal Conductance Fluctuations in the Magnetoresistance of Submicron n^+GaAs Wires"
G.P. Whittington, **R.P. Taylor**, P.C. Main, L. Eaves, S. Thoms, S.P. Beaumont, C.D.W. Wilkinson, C.R. Stanley and J. Frost
Proceedings of "The 2nd International Conference on Superlattices, Microstructures and Microdevices", Goteburg, Sweden, 1986
Published: *Superlattices and Microstructures* **2** 381 (1986) (REFEREED)

3. "Aperiodic Quantum Magnetoresistance Oscillations in Submicron n^+GaAs Wires"
R.P. Taylor, L. Eaves, P.C. Main, G.P. Whittington, S. Thoms, S.P. Beaumont and C.D.W. Wilkinson
Proceedings of The Application of High Magnetic Fields in Semiconductor Physics, Wurzburg, West Germany, 1986
Published: Springer, Solid State Sciences **71** 328 (1987) (REFEREED)

4. "Fourier Analysis of Universal Conductance Fluctuations in the Magneto-resistance of Submicron-size n^+GaAs Wires"
M.L. Leadbeater, **R.P. Taylor**, P.C. Main, L. Eaves, S.P. Beaumont, I. McIntyre, S. Thoms and C.D.W. Wilkinson
Proceedings of The International Symposium on GaAs and Related Compounds, Heraklion, Greece, 1987
Published: The Institute of Physics Conference Series **91** 573 (1988) (REFEREED)

5. "Universal Conductance Fluctuations in the Magnetoresistance of Submicron-size n^+GaAs Wires and Laterally Confined n^-GaAs/(AlGa)As Heterostructures"
R.P. Taylor, M.L. Leadbeater, G.P. Whittington, P.C. Main, L. Eaves, S.P. Beaumont, I. McIntyre, S. Thoms and C.D.W. Wilkinson
Proceedings of the "7th International Conference on Electronic Properties of

Two Dimensional Systems", Santa Fe, USA, 1987
Published: *Surface Science* **196** 52 (1988) (REFEREED)

6. "Electron Beam Lithography and Dry Etching Techniques for the Fabrication of Quantum Wires in GaAs and (AlGa)As Epilayer Systems"
S.P. Beaumont, C.D.W. Wilkinson, S. Thoms, R. Cheung, I. McIntyre, **R.P. Taylor**, M.L. Leadbeater, P.C. Main and L. Eaves
Proceedings of The International Conference on the Physics and Technology of Submicron Structures, Mauterndorf, Austria, 1988
Published: Springer, Solid State Sciences 14 (1988) (REFEREED)

7. "Electron Heating in a Submicron-size n^+GaAs Wire"
R.P. Taylor, P.C. Main, L. Eaves, S.P. Beaumont, S. Thoms and C.D.W. Wilkinson
Proceedings of "The 3rd International Conference on Superlattices, Microstructures and Microdevices", Trieste, Italy, 1988
Published: *Superlattices and Microstructures* **5** 575 (1988) (REFEREED)

8. "Aperiodic Conductance Fluctuations as a Probe of Changes in the Microscopic Scattering Configuration in n^+GaAs:Si Wires"
R.P. Taylor, P.C. Main, L. Eaves, S.P. Beaumont, S. Thoms and C.D.W. Wilkinson
Proceedings of The 19th International Conference on Physics of Semiconductors, Warsaw, Poland, 1988
Published: The Institute of Physics, Polish Academy of Sciences **1** 83 (1988) (REFEREED)

9. "Magnetoresistance Effects in Laterally Confined n^-GaAs/(AlGa)As Heterostructures"
R.P. Taylor, P.C. Main, L. Eaves, S. Thoms, I. McIntyre, S.P. Beaumont, and C.D.W. Wilkinson
Published: *Journal of Physics: Condensed Matter* **1** 10413 (1989) (REFEREED)

10. "Conduction in n^+GaAs Wires"
P.C. Main, **R.P. Taylor**, L. Eaves, S. Thoms, S.P. Beaumont and C.D.W. Wilkinson
Proceedings of "The Physics and Engineering of One and Zero Dimensional Semiconductors", NATO Summer School, Cadiz, Spain 1989
Published: *NATO ASI Series B: Physics* **214** 51 (1990) (REFEREED)

11. "Electronic Properties of Laterally Confined n^-GaAs/(AlGa)As Heterostructures"
R.P. Taylor, P.C. Main, L. Eaves, S. Thoms, I. McIntyre, S.P. Beaumont and C.D.W. Wilkinson
Proceedings of "The 4th International Conference on Modulated Semiconductor Structures", Ann Arbor, USA, 1989
Published: *Surface Science* **228** 269 (1990) (REFEREED)

12. "Magnetoresistance Oscillations in a 2DEG Subject to a One Dimensional Periodic Potential"
M. Davison, E.S. Alves, M. Dellow, P.H. Beton, **R.P. Taylor**, P.C. Main, L. Eaves, S.P. Beaumont, C.D.W. Wilkinson, J. Portal and L. Curry
Proceedings of The 20th International Conference on the Physics of Semiconductors, Thesaloniki, Greece, 1990
Published: World Scientific Press **3** 2423 (1990) (REFEREED)

13. "Mesoscopic Charge Mapping by Conductance Fluctuations"
M. Davison, **R.P. Taylor**, P.C. Main, P.H. Beton, S.P. Beaumont and C.D.W. Wilkinson
Proceedings of "The 19th International Conference on Low Temperature Physics", Brighton, UK, 1990
Published: *Physica B* **165** and **166** 865 (1990) (REFEREED)

14. "Temperature and Angular Dependence of Magnetoresistance Oscillations in a 2DEG Subjected to a Periodic Potential"
M. Davison, **R.P. Taylor**, E.S. Alves, P.H. Beton, M. Dellow, P.C. Main, L. Eaves, M. Henini, O.H. Hughes, S.P. Beaumont and C.D.W. Wilkinson

Proceedings of "The 19th International Conference on Low Temperature Physics", Brighton, UK, 1990
Published: *Physica B* **165** and **166** 867 (1990) (REFEREED)

15. "Temperature Dependence of Magnetoresistance Oscillations in a 2DEG Subjected to a Periodic Potential"
P.H. Beton, P.C. Main, M. Davison, M. Dellow, **R.P. Taylor**, E.L. Alves, L. Eaves, S.P. Beaumont and C.D.W. Wilkinson
Published: *Physical Review B* **42** 9689 (1990) (REFEREED)

16. "Collimation Effects in Quantum Point Contacts"
R.P. Taylor, A.S. Sachrajda, J.A. Adams, P.T. Coleridge and P. Zawadzki
Proceedings of "The International Symposium on Analogies in Optics and Micro-electronics", Eindhoven, The Netherlands, 1991
Published: *Physica B* **175** 243 (1991) (REFEREED)

17. "Experimental Investigation of Quantum Point Contacts Separated by Open and Enclosed Regions"
R.P.Taylor, A.S.Sachrajda, J.A.Adams, C.R.Leavens, P.Zawadzki and P.Coleridge
Proceedings of "The International Symposium on Nanostructures and Mesoscopic Systems", Santa Fe, USA, 1991
Published: *Superlattices and Microstructures* **11** 219 (1992) (REFEREED)

18. "Classical and Quantum Mechanical Transmission Effects in Submicron-Size Dots"
R.P. Taylor, A.S. Sachrajda, J.A. Adams, P. Zawadzki, P.T. Coleridge and M. Davies
Proceedings of "The 9th International Conference on Electronic Properties of Two Dimensional Systems", Nara, Japan, 1991
Published: *Surface Science* **263** 247 (1992) (REFEREED)

19. "Low Frequency Noise in Multiple Quantum Point Contact Systems"
R.P. Taylor, S. Fortin, A.S. Sachrajda, J.A. Adams, M. Davies, M. Fallahi, P.T. Coleridge and P. Zawadzki
Published: *Physical Review B* **45** 9149 (1992) (REFEREED)

20. "Non-linear Behaviour in the Magneto-transport through Continuous-gate and Split-gate Nanostructures"
R.P. Taylor, S. Fortin, A.S. Sachrajda, J.A. Adams, P. Zawadzki, P.T. Coleridge, M. Davies and P. Marshall
Proceedings of "The 6th Canadian Semiconductor Technology Conference", Ottawa, 1992
Published: *Canadian Journal of Physics* **70** 1001 (1992) (REFEREED)

21. "Quantum Interference Effects as a Characterisation Tool to Probe the Sidewalls of Submicron-size n^+GaAs Channels"
R.P. Taylor, P.C. Main, L. Eaves, S. Thoms, S.P. Beaumont and C.D.W. Wilkinson
Proceedings of "The 6th Canadian Semiconductor Technology Conference", Ottawa, 1992
Published: *Canadian Journal of Physics* **70** 979 (1992) (REFEREED)

22. "Discrete Electron Effects in Lateral Quantum Islands"
A.S. Sachrajda, **R.P. Taylor**, C. Dharma-Wardana, J.A. Adams, P. Zawadzki, P.T. Coleridge and M. Davies
Proceedings of "The 6th Canadian Semiconductor Technology Conference", Ottawa, 1992
Published: *Canadian Journal of Physics* **70** 1148 (1992) (REFEREED)

23. "The Effect of Coulomb Interactions on the Magnetoresistance Oscillations of Quantum Dots"
C. Dharma-Wardana, **R.P. Taylor** and A.S. Sachrajda
Published: *Solid State Communications* **84** 631 (1992) (REFEREED)

24. "Aharonov-Bohm Oscillations in the Coulomb Blockade Regime"
R.P. Taylor, A.S. Sachrajda, P. Zawadzki, P.T. Coleridge and J.A. Adams
Published: *Physical Review Letters* **69** 1989 (1992) (REFEREED)

25. "Magneto-conductance Oscillations in Quantum Dots"
C. Dharma-Wardana, A.S. Sachrajda and **R.P. Taylor**
American Physical Society Bulletin **38** 699 (1993) (UNREFEREED, EXTENDED ABSTRACT)

26. "Transport Properties in a Quantum Dot in Magnetic Fields"
K. Ishibashi, J.P. Bird, **R.P. Taylor**, M. Stopa, T. Sugano and Y. Aoyagi
Published: *Proceedings of Alloy Semiconductor Physics and Electronics* (Japan)
II-9 69 (1993) (REFEREED)

27. "Demonstration of Quantum Dots and Quantum Wires with Removable Impurities"
Y. Feng, A.S. Sachrajda, **R.P. Taylor**, J.A. Adams, M. Davies, P. Zawadski, P.T. Coleridge, D. Landheer, P.A. Marshall and R. Barber
Published: *Applied Physics Letters* **63** 1666 (1993) (REFEREED)

28. "Spin-controlled Resonances in the Magneto-transport in Quantum Dots"
A.S. Sachrajda, **R.P. Taylor**, C. Dharma-Wardana, P. Zawadski, J.A. Adams and P.T. Coleridge
Published: *Physical Review B Rapid Communications* **47** 6811 (1993) (REFEREED)

29. "Fabrication of Nanostructures with Multi-level Architecture"
R.P. Taylor, J.A. Adams, M. Davies, P.A. Marshall and R. Barber
Published: *Journal of Vacuum Science and Technology B* **11** 628 (1993) (REFEREED)

30. "Zero and Low Magnetic Field Characterisation of AlGaAs/GaAs Lateral Dots"
R.P. Taylor, A.S. Sachrajda, J.A. Adams, P.T. Coleridge and P. Zawadzki
Published: *Physical Review B* **47** 4458 (1993) (REFEREED)

31. "The Fabrication of Nanostructures with Addressable Submicron Schottky Gate and Ohmic Contacts"
Y. Feng, M. Davies, A.S. Sachrajda, **R.P. Taylor**, J.A. Adams, P. Zawadzki, P.T. Coleridge, P. Marshall and R. Barber
Published: *Proceedings of "The International Semiconductor Device Research Symposium"*, Charlottesville, USA, 1993 (REFEREED)

32. "Investigation of Ohmic Contacts to AlGaAs/GaAs Heterojunctions"
P.T. Coleridge, M. Davies, Y. Feng, **R.P. Taylor**, J. McCaffrey and P.A. Marshall
Proceedings of The American Physical Society Annual Meeting, Pittsburgh, U.S.A., 1994
American Physical Society Bulletin **39** 251 (1994) (UNREFEREED, EXTENDED ABSTRACT)

33. "Gate-induced Periodicities in High Quality Electron Systems in the Extreme Quantum Limit"
C.J. Mellor, **R.P. Taylor**, R.G. Clark, A.G. Davies, S.A. Brown, E.E. Mitchell, J.J. Harris and C.T. Foxon
Proceedings of "The American Physical Society Annual Meeting", Pittsburgh, U.S.A., 1994,
American Physical Society Bulletin **39** 351 (1994) (UNREFEREED, EXTENDED ABSTRACT)

34. "Artificial Impurities in Quantum Wires: From Classical to Quantum Behaviour"
G. Kirczenow, A.S. Sachrajda, Y. Feng, **R.P. Taylor**, L. Henning, J. Wang, P. Zawadzki and P.T. Coleridge
Proceedings of "The American Physical Society Annual Meeting", Pittsburgh, U.S.A., 1994
American Physical Society Bulletin **39** 791 (1994) (UNREFEREED, EXTENDED ABSTRACT)

35. "Aharonov-Bohm Oscillations from Inter-edge State Scattering in Quantum Dots"
C. Barnes, **R.P. Taylor**, A.S. Sachrajda and T. Sugano
Proceedings of "The American Physical Society Annual Meeting", Pittsburgh, U.S.A., 1994
American Physical Society Bulletin **39** 71 (1994) (UNREFEREED, EXTENDED ABSTRACT)

36. "Density of Electrons in Lateral Quantum Dots by Semiclassical Analysis"
R.P. Taylor, A.S. Sachrajda, P.J. Kelly and D. Freedman
Published: *Solid State Communications* **87** 579 (1994) (REFEREED)

37. "A Patterned Gate Architecture to Study High Quality AlGaAs/GaAs Heterostructures

in the Extreme Quantum Limit"
C.J. Mellor, **R.P. Taylor**, R.G. Clark, A.G. Davies, S.A. Brown, E.E. Mitchell, J.J. Harris and C.T. Foxon
Published: *Semiconductor Science and Technology* **9** 1 (1994) (REFEREED)

38. "Australian National Pulsed Magnet Laboratory for Condensed Matter Physics Research"
R.G. Clark, R.P. Starrett, R. Newbury, A.V. Skougarevsky, S.A. Brown, A.G. Davies, R.B. Dunford, D. Olatona, L.D. Macks, E.E. Mitchell and **R.P. Taylor**
Proceedings of "The 4th International Symposium on Semiconductor Physics: Frontiers in High Magnetic Fields", Tokyo, 1993
Published: *Physica B* **201** 565 (1994) (REFEREED)

39. "The Extreme Quantum Regime of 2D Electron and Hole Systems"
R.G. Clark, A.G. Davies, S.A. Brown, R.B. Dunford, P.E. Simmonds, A.C. Lindsay, R. Newbury, R.P. Starret, A.V. Skougarevsky, E.E. Mitchell, **R.P. Taylor**, C.J. Mellor B.L. Gallagher, C.T. Foxon and J.J. Harris
Proceedings of “The 4th International Symposium on Semiconductor Physics: Frontiers in High Magnetic Fields", Tokyo, 1993
Published: *Physica B* **201** 301 (1994) (REFEREED)

40. "Electron-Electron Interactions and the Magnetoconductance of Submicron Quantum Dots"
A.S. Sachrajda, **R.P. Taylor**, C. Dharma-wardana, J.A. Adams, P. Zawadzki and P.T. Coleridge, Invited Contribution
Proceedings of "The 10th International Conference on Electronic Properties of Two Dimensional Systems", Newport, U.S.A., 1993
Published: *Surface Science* **305** 527 (1994) (REFEREED)

41. "Anti-Collimation of Ballistic Electrons by a Potential Barrier"
P.T. Coleridge, **R.P. Taylor**, A.S. Sachrajda and J.A. Adams
Proceedings of "The 10th International Conference on Electronic Properties of Two Dimensional Systems", Newport, USA, 1993
Published: *Surface Science* **305** 448 (1994) (REFEREED)

42. "Fabrication and Characterisation of Multi-level Lateral Nano-devices"
R.P. Taylor, Y. Feng, A.S. Sachrajda, J.A. Adams and M. Davies
Proceedings of "The 10th International Conference on Electronic Properties of Two Dimensional Systems", Newport, USA, 1993
Published: *Surface Science* **305** 648 (1994) (REFEREED)

43. "Artificial Impurities in Quantum Wires: From Classical to Quantum Behaviour"
G. Kirczenow, A.S. Sachrajda, Y. Feng, **R.P. Taylor**, L. Henning, J. Wang, P. Zawadski and P.T. Coleridge
Published: *Physical Review Letters* **72** 2069 (1994) (REFEREED)

44. "Magneto-Coulomb Oscillations"
J.P. Bird, K. Ishibashi, M. Stopa, **R.P. Taylor**, Y. Aoyagi and T. Sugano
Published: *Physical Review B Rapid Communications* **49** 11488 (1994) (REFEREED)

45. "Magnetoresistance of a Nanoscale Antidot"
A.S. Sachrajda, Y. Feng, **R.P. Taylor**, G. Kirczenow, L. Henning, J. Wang, P. Zawadski and P.T. Coleridge
Published: *Physical Review B* **50** 10856 (1994) (REFEREED)

46. "The Role of Surface Gate Technology for AlGaAs/GaAs Nanostructures"
R.P. Taylor
Published: *Journal of Nanotechnology* **5** 183 (1994) (REFEREED)

47. "Physical and Electrical Characterisation of Ohmic Contacts to AlGaAs/GaAs Heterostructures"

R.P. Taylor, P.T. Coleridge, Y. Feng, M. Davies, J. McCaffrey and P.A. Marshall
Published: *Journal of Applied Physics* **76** 7966 (1994) (REFEREED)

48. "Demonstration of Intricate Gate, Ohmic and Interconnect Metallisations for Nanostructure Construction"
Y. Feng, **R.P. Taylor**, P.T. Coleridge, A.S. Sachrajda, M. Davies, P. Zawadski and J.P. McCaffrey
Proceedings of "The 7th International Conference on Superlattices, Microstructures and Microdevices", Banff, Canada, 1994
Published: *Superlattices and Microstructures* **15** 85 (1994) (REFEREED)

49. "A Tunable Ballistic Electron Cavity Exhibiting Geometry Induced Weak Localisation"
R.P. Taylor, R. Newbury, R.B. Dunford, P.T. Coleridge, A.S. Sachrajda and J.A. Adams
Proceedings of "The 7th International Conference on Superlattices, Microstructures and Microdevices", Banff, Canada, 1994
Published: *Superlattices and Microstructures* **16** 317 (1994) (REFEREED)

50. "Classically, the Strangest of Things, When Quantum Dots are Quantum Rings"
A. Delage, Y. Feng, P.J. Kelly, A.S. Sachrajda and **R.P. Taylor**
Proceedings of The 5th conference on Quantum Well and Superlattice Physics, *LASE'93*, Los Angeles, USA, 1994
Published by the International Society for Optical Engineering **2139** 353 (1995) (REFEREED)

51. "Artificial Impurities in Quantum Wires and Dots"
A.S. Sachrajda, Y. Feng, G. Kirczenow, **R.P. Taylor**, B.L. Johnson, P.J. Kelly, P. Zawadski and P.T. Coleridge
Proceedings of the NATO Advanced Study Institute, Lucca, Italy, 1994
Published: *Quantum Transport in Ultra-small Devices*, Plenum Press 133 (1995) (REFEREED)

52. "Artificial Impurities in Quantum Wires"
A.S. Sachrajda, Y. Feng, **R.P. Taylor**, G. Kirczenow, B.L. Johnson, P. Zawadski and P.T. Coleridge
Invited contribution, *Proceedings of The 22nd International Conference on the Physics of Semiconductors*, Vancouver, Canada, 1994
Published: World Scientific (Ed. by D.Lockward) **2** 1815 (1995) (INVITED & REFEREED)

53. "The Quantum Hall Effect and Inter-edge State Tunnelling Within a Barrier"
B.L. Johnson, A.S. Sachrajda, G. Kirczenow, Y. Feng, **R.P. Taylor**, L. Henning, J. Wang, P. Zawadski and P.T. Coleridge
Published: *Physical Review B* **51** 7650 (1995) (REFEREED)

54. "Classical and Weak Localisation Processes in a Tunable Ballistic Electron Cavity"
R.P. Taylor, R. Newbury, R.B. Dunford, P.T. Coleridge, A.S. Sachrajda and J.A. Adams
Published: *Physical Review B* **51** 9801 (1995) (REFEREED)

55. "Fabrication of Nanostructures with Submicron Schottky and Ohmic Contacts"
Y. Feng, A.S. Sachrajda, P.T. Coleridge, **R.P. Taylor**, M. Davies and P.A. Marshall
Published: *Journal of Vacuum Science and Technology B* **13** 2875 (1995) (REFEREED)

56. "Lead-induced Transition to Chaos in Ballistic Mesoscopic Billiards"
J.P. Bird, D.M. Olatona, R. Newbury, **R.P. Taylor**, K. Ishibashi, M. Stopa, Y. Aoyagi and T. Sugano
Published: *Physical Review B Rapid Communication* **52** R14336 (1995) (REFEREED)

57. "Transition From Chaotic to Regular Quantum Scattering in Mesoscopic Billiards With Nominally Regular Geometry"
J.P. Bird, D.K. Ferry, G. Edwards, D.M. Olatona, R. Newbury, **R.P. Taylor**, K. Ishibashi Y. Aoyagi, T. Sugano and Y. Ochiai
Proceedings of "The 3rd International Symposium on New Phenomena in Mesoscopic Structures", Hawaii, USA 1995
Published: *Physica B* **227** 148 (1996) (REFEREED)

58. "Investigations of Electron Interference and Quantum Chaos in Ballistic Quantum Dots with Square Geometry"
J.P. Bird, K. Ishibashi, R. Newbury, D.M. Olatona, **R.P. Taylor**, Y. Ochiai, Y. Aoyagi and T. Sugano
Proceedings of "The 7th Brazilian Workshop on Semiconductor Physics", Rio de Janeiro, Brazil, 1995
Published: *Brazilian Journal of Physics* **26** 1 (1996) (REFEREED)

59. "Geometry Induced Quantum Interference: a Continuous Evolution From Square to Sinai Billiard"
R.P. Taylor, R. Newbury, A.S. Sachrajda, Y. Feng, N. Zhu, H. Guo, P.T. Coleridge, A. Delage, P.J. Kelly, Z. Wasilewski and P. Zawadski
Proceedings of "NanoMes 96" (3rd International Symposium on Nanostructures and Mesoscopic Systems), Santa Fe, USA, 1996
Published: *Superlattices and Microstructures* **20** 297 (1996) (REFEREED)

60. "The Topological Transition from a Corbino Disc to Hall Bar Geometry"
A.S. Sachrajda, Y. Feng, **R.P. Taylor**, R. Newbury and P.T. Coleridge
Proceedings of "NanoMes 96" (3rd International Symposium on Nanostructures and Mesoscopic Systems), Santa Fe, USA, 1996
Published: *Superlattices and Microstructures* **20** 651 (1996) (REFEREED)

61. "The Role of Lead Openings in Regular Mesoscopic Billiards"
J.P. Bird, D.K. Ferry, R. Akis, R. Newbury, **R.P. Taylor**, D.M. Olatona, Y. Ochiai, K. Ishibashi, Y. Aoyagi and T. Sugano
Invited presentation in the proceedings of "NanoMes 96" (3rd International Symposium on Nanostructures and Mesoscopic Systems), Santa Fe, USA, 1996
Published: *Superlattices and Microstructures* **20** 287 (1996) (REFEREED)

62. "The Transition from a Square to Sinai Billiard"
R.P. Taylor, R. Newbury, A.S. Sachrajda, Y. Feng, P.T. Coleridge, Z. Wasilewski N. Zhu and H. Guo
Proceedings of The 23rd International Conference on Semiconductor Physics, Berlin, Germany, 1996
Published: World Scientific (Eds. M. Scheffler and R. Zimmermann) **2** 1549 (1996) (REFEREED)

63. "The Use of Wide Ballistic Cavities to Investigate Local Weak Localisation Processes Induced by Geometric Scattering"
R.P. Taylor, R. Newbury, A.S. Sachrajda, P.T. Coleridge, P. Zawadzki, R.B. Dunford, Y. Feng, J.P. Bird, C.R. Leavens, J.M. Cadogan, J.A. Adams, P.J. Kelly, M. Davies and S. Brown
Published: *Semiconductor Science and Technology* **11** 1 (1996) (REFEREED)

64. "The Influence of Injection Properties on the Electron Scattering Dynamics of Ballistic Cavities"
R.P. Taylor, J.P. Bird and R. Newbury
Published: *The Journal of the Physical Society of Japan* **65** 2730 (1996) (REFEREED)

65. "Can Ohmic Spikes Define Quantum Systems?"
R.P. Taylor, R. Newbury, A.S. Sachrajda, Y. Feng, P.T. Coleridge, M. Davies and J.P. McCaffrey
Proceedings of "The New Zealand and Australian Institutes of Physics Annual Condensed Matter Physics Meeting" (*Wagga 97*), Pakatoa Island, New Zealand, 1997
ISSN 1037-1214, page TM08, (1997) (UNREFEREED, EXTENDED ABSTRACT)

66. "Fractal Behaviour in the Magnetoresistance in a Sinai Billiard"
R. Newbury, **R.P. Taylor**, A.S. Sachrajda, Y. Feng, P.T. Coleridge, C. Dettmann and T.M. Fromhold
Proceedings of "The New Zealand and Australian Institutes of Physics Annual Condensed Matter Physics Meeting" (*Wagga'97*), Pakatoa Island, New Zealand, 1997
ISSN 1037-1214, page WM04, (1997) (UNREFEREED, EXTENDED ABSTRACT)

67. "Electron Behaviour In AlGaAs/GaAs Square Quantum Dots"
A.P. Micolich, **R.P. Taylor**, J.P. Bird and R. Newbury

Proceedings of "The New Zealand and Australian Institutes of Physics Annual Condensed Matter Physics Meeting" (*Wagga'97*), Pakatoa Island, New Zealand, 1997
ISSN 1037-1214, page TP20, (1997) (UNREFEREED, EXTENDED ABSTRACT)

68. "Aharonov-Bohm Oscillations in Quantum Dots: Precise Departures from h/e Periodicity"
J.P. Bird, M. Stopa, R. Newbury, **R.P. Taylor**, K. Ishibashi, Y. Aoyagi and T. Sugano
Proceedings of "The 8th International Conference on Superlattices, Microstructures and Microdevices", Liege, Belgium, 1996
Published: *Superlattices and Microstructures* **22** 57 (1997) (REFEREED)

69. "Can Ohmic Spikes Define Quantum Systems?"
R.P. Taylor, R. Newbury, A.S. Sachrajda, Y. Feng, P.T. Coleridge, J.P. McCaffrey, M. Davies and J.P. Bird
Proceedings of "QDS'96" (1996 International Symposium on the Formation, Physics and Device Application of Quantum Dot Structures), Sapporo, Japan, 1996
Published: *Japanese Journal of Applied Physics* **36** 3964 (1997) (REFEREED)

70. "Fractal Behaviour in the Magnetoresistance of Chaotic Billiards"
R. Newbury, **R.P. Taylor**, A.S. Sachrajda, Y. Feng, P.T. Coleridge, C. Dettmann and T.M. Fromhold
Proceedings of "QDS'96" (1996 International Symposium on the Formation, Physics and Device Application of Quantum Dot Structures), Sapporo, Japan, 1996
Published: *Japanese Journal of Applied Physics* **36** 3991 (1997) (REFEREED)

71. "The Role of Phase Coherence in Quantum Transport Through Open Ballistic Cavities"
J.P. Bird, A.P. Micolich, R. Akis, D.K. Ferry, R. Newbury, **R.P. Taylor**, D.M. Olatona, R. Wirtz, Y. Ochiai, K. Ishibashi, Y. Aoyagi and T. Sugano
Proceedings of "QDS'96" (1996 International Symposium on the Formation, Physics and Device Application of Quantum Dot Structures), Sapporo, Japan, 1996
Published: *Japanese Journal of Applied Physics* **36** 3969 (1997) (REFEREED)

72. "Self-similar Magnetoresistance in a Semiconductor Sinai Billiard"
R.P. Taylor, R. Newbury, A.S. Sachrajda, Y. Feng, P.T. Coleridge, C. Dettmann, N. Zhu, H. Guo, A. Delage, P.J. Kelly and Z. Wasilewski
Published: *Physical Review Letters* **78** 1952 (1997) (REFEREED)

This work was also the focus of "Fractal Resistance in a Transistor" by T.M. Fromhold *Nature* **386** 124 (1997)

73. "Quantum Transport in Open Mesoscopic Cavities"
J.P. Bird, R. Akis, D.K. Ferry, D.P. Piven, K. Connolly, **R.P. Taylor**, R. Newbury, D.M. Olatona, A.P. Micolich, R. Wirtz, Y. Ochiai, Y. Okubo, K. Ishibashi, Y. Aoyagi and T. Sugano
Invited contribution to *Chaos, Solitons and Fractals*, Pergamon/ Elsevier Press, (Ed. N. Nakamura) **8** 1299 (1997) (INVITED & REFEREED)

74. "Ohmic Contact Spike Arrays for Nanostructure Device Fabrication: Spike Distribution and Geometry Scattering of the Electron Wave Current"
R. Newbury, **R.P. Taylor**, A.S. Sachrajda, P.T. Coleridge, Y. Feng, M. Davies and J.P. McCaffrey
Proceedings of the Conference on Optoelectronic and Microelectronic Materials and Devices (COMMAD'96), Canberra, Australia, 1996
Published*: IEEE Journal* ISBN 0-7803-3374-8/97 page 192 (1997) (REFEREED)

75. "Tunable Semiconductor Sinai Billiards"
R.P. Taylor, R. Newbury, A.S. Sachrajda, Y. Feng and P.T. Coleridge
Proceedings of the Conference on Optoelectronic and Microelectronic Materials and Devices (COMMAD'96), Canberra, Australia, 1996
Published: *IEEE Journal* ISBN 0-7803-3374-8/97 page 171 (1997) (REFEREED)

76. "Correlation Analysis of Self-similarity in Semiconductor Billiards"
R.P. Taylor, A.P. Micolich, R. Newbury and T.M. Fromhold

Published: *Physical Review B Rapid Communications* **56** R12733 (1997) (REFEREED)

77. "Fractal Transistors"
R.P. Taylor, A.P. Micolich, R. Newbury, C. Dettmann and T.M. Fromhold
Published: *Semiconductor Science and Technology* **12** 1459 (1997) (REFEREED)

78. "Phase Breaking as a probe of the Intrinsic Level Spectrum of Open Quantum Dots"
J.P. Bird, H. Linke, J. Cooper, A.P. Micolich, D.K. Ferry, R. Akis, Y. Ochiai, **R.P. Taylor**, R. Newbury, P. Omling, Y. Aoyagi and T. Sugano
Proceedings of "The 10th International Conference on Hot Carriers in Semiconductors", Berlin, Germany, 1997
Published: *Physica Status Solidi B* **204** 314 (1997) (REFEREED)

79. "Correlation Analysis of Statistical and Exact Self-similarity in Billiards"
A.P. Micolich, **R.P. Taylor**, R. Newbury, J.P. Bird , T.M. Fromhold and J. Cooper
Proceedings of "The New Zealand and Australian Institutes of Physics Annual Condensed Matter Physics Meeting", (*Wagga'98*), Wagga, Australia, 1998
ISSN 1037 1214, page TM11 (1998) (UNREFEREED, EXTENDED ABSTRACT)

80. "Fractional Brownian Statistics of Magneto-conductance Fluctuations"
A.P. Micolich, **R.P. Taylor**, R. Newbury and J.P. Bird
Proceedings of "The New Zealand and Australian Institutes of Physics Annual Condensed Matter Physics Meeting", (*Wagga'98*), Wagga, Australia, 1998
ISSN 1037 1214, page TP49 (1998) (UNREFEREED, EXTENDED ABSTRACT)

81. "Geometry-induced Fractal Behaviour in a Semiconductor Billiard"
A.P. Micolich, **R.P. Taylor**, R. Newbury, J.P. Bird, R. Wirtz, C.P. Dettmann, Y. Aoyagi and T. Sugano
Published: *Journal of Physics: Condensed Matter* **10** 1339 (1998) (REFEREED)

82. "Fractals and Self-similarity in Mesoscopic Semiconductor Billiards"
A.P. Micolich, **R.P. Taylor**, R. Newbury, T.M. Fromhold and C.R. Tench
Published: *Australian and New Zealand Physicist* **35** 151 (1998) (INVITED)

83. "Experimental and Theoretical Investigations of Clusters in the Magnetofingerprints of a Sinai Billiard"
R.P. Taylor, A.P. Micolich, R. Newbury, T.M. Fromhold, C. Dettmann and C.R. Tench
Proceedings of "The 2nd International Conference on Low Dimensional Structures and Devices", Lisbon, Portugal, 1997
Published: *Materials Science and Engineering* B **51** 212 (1998) (REFEREED)

84. "Self-similar Conductance Fluctuations in a Sinai Billiard with a Mixed Chaotic Phase Space: Theory and Experiment"
T.M. Fromhold, C.R. Tench, **R.P. Taylor**, A.P. Micolich and R. Newbury
Proceedings of "The 12th International Conference on the Electronic Properties of Two Dimensional Systems", Tokyo, Japan, 1997
Published: *Physica B* **249-251** 334 (1998) (REFEREED)

85. "Geometry-induced Fractal Behaviour: Fractional Brownian Motion in a Ballistic Mesoscopic Billiard"
A.P. Micolich, **R.P. Taylor**, R. Newbury, J.P. Bird, T.M. Fromhold, Y. Aoyagi and T. Sugano
Proceedings of "The 12th International Conference on the Electronic Properties of Two Dimensional Systems", Tokyo, Japan, 1997
Published: *Physica B* **249-251** 343 (1998) (REFEREED)

86. "Effect on Wavefunction Scarring in Magneto-transport of Quantum Dots"
Y. Ochiai, Y. Okuba, N. Sasaki, J.P. Bird, K. Ishibashi, Y. Aoyagi, T. Sugano, A.P. Micolich, **R.P. Taylor**, R. Newbury, D. Vasileska, R. Akis and D.K. Ferry
Proceedings of "The 12th International Conference on the Electronic Properties of Two Dimensional Systems", Tokyo, Japan, 1997
Published: *Physica B* **249-251** 353 (1998) (REFEREED)

87. "Experimental and Theoretical Investigations of Electron Dynamics in a Semiconductor Sinai Billiard"
A.P. Micolich, **R.P. Taylor**, R. Newbury, C. Dettmann and T.M. Fromhold
Published: *Australian Journal of Physics* **51** 1 (1998) (REFEREED)

88. "Scale Factor Mapping of Statistical and Exact Self-similarity in Billiards"
A.P. Micolich, **R.P. Taylor**, J.P. Bird, R. Newbury, T.M. Fromhold, J. Cooper, Y. Aoyagi and T. Sugano
Proceedings of "The 2nd International Workshop on Surfaces and Interfaces of Mesoscopic Devices, Hawaii, USA, 1997
Published: *Semiconductor Science and Technology* **13** 1 (1998) (REFEREED)

89. "Exact and Statistical Self-similarity in Magnetoconductance Fluctuations: a Unified Picture"
R.P. Taylor, A.P. Micolich, R. Newbury, J.P. Bird, T.M. Fromhold, J. Cooper, Y. Aoyagi and T. Sugano
Published: *Physical Review B Brief Reports*, **58** 11107 (1998) (REFEREED)

90. "An Investigation of Current Injection Properties of Ohmic Spikes in Nanostructures"
R.P. Taylor, R. Newbury, A.S. Sachrajda, Y. Feng, P.T. Coleridge, M. Davies and J.P. McCaffrey
Proceedings of "The 8th International Conference on Superlattices, Microstructures and Microdevices", Liege, Belgium, 1996
Published: *Superlattices and Microstructures* **24** (5) 337 (1998) (REFEREED)

91. "Fractal Conductance Fluctuations in Mesoscopic Billiards: an Observation Over Three Orders of Magnitude"
R.P. Taylor, A.P. Micolich, R. Newbury, T.M. Fromhold and H. Linke
Proceedings of "The American Physical Society Annual Meeting", Atlanta, U.S.A., 1999
American Physical Society Bulletin, Centennial Meeting programme,
DP01.185 (1999) (UNREFEREED, EXTENDED ABSTRACT)

92. "Experimental Quantum Ratchets Based on Nanostructures"
H. Linke, P.E. Lindelof, A. Lofgren, R. Newbury, P. Omling, W. Sheng, A. Svensson, **R.P. Taylor** and Hongqi Xu
Proceedings of "The American Physical Society Annual Meeting", Atlanta, U.S.A., 1999
American Physical Society Bulletin, Centennial Meeting programme,
DP01.185 (1999) (UNREFEREED, EXTENDED ABSTRACT)

93. "Fractal Magneto-conductance in Mesoscopic Billiards: Temperature and Size Dependence"
A.P. Micolich, **R.P. Taylor**, J.P. Bird , R. Newbury, Y. Aoyagi and T. Sugano
Proceedings of "The New Zealand and Australian Institutes of Physics Annual Condensed Matter Physics Meeting", (*Wagga'99*), Wagga, Australia, 1999
ISSN 1037-1214, Page TM8, (1999) (UNREFEREED, EXTENDED ABSTRACT)

94. "Physical Realisation of Weierstrass Scaling in Soft-wall Antidot Billiards"
A.P. Micolich, **R.P. Taylor**, T.M. Fromhold, C.R. Tench and R. Newbury
Proceedings of "The New Zealand and Australian Institutes of Physics Annual Condensed Matter Physics Meeting", (*Wagga'99*), Wagga, Australia, 1999
ISSN 1037-1214, Page WP14, (1999) (UNREFEREED, EXTENDED ABSTRACT)

95. "Examination of the 0.7(2e2/h) Feature in the Quantised Conductance of a Quantum Point Contact: Varying the Effective g-Factor with Hydrostatic Pressure"
R. Wirtz, J.T. Nichols, **R.P. Taylor**, R. Newbury, W.R. Tribe and M. Y. Simmons
Proceedings of "The New Zealand and Australian Institutes of Physics Annual Condensed Matter Physics Meeting", (*Wagga'99*), Wagga, Australia, 1999
ISSN 1037-1214, Page WP10, (1999) (UNREFEREED, EXTENDED ABSTRACT)

96. "Unification of Exact and Statistical Self-similarity in Semiconductor Billiards"
R.P. Taylor, A.P. Micolich, T.M. Fromhold, C.R. Tench, R. Newbury, J.P. Bird, J. Cooper Y. Aoyagi and T. Sugano

Proceedings of The 24th International Conference on the Physics of Semiconductors, Jerusalem, Israel, 1998
Published: World Scientific (available on CDROM, Chapter 7, A14 (1999)) (REFEREED)

97. "Physical Realisation of Weierstrass Scaling using a Quantum Interferometer"
A.P. Micolich, **R.P. Taylor**, T.M. Fromhold, C.R. Tench and R. Newbury
Proceedings of "The 11th International Conference on Superlattices, Microstructures and Microdevices", Hurgarda, Egypt, 1998
Published: *Superlattices and Microstructures* **25** 207 (1999) (REFEREED)

98. "Temperature Dependence of the Fractal Dimension of Magneto-conductance Fluctuations in a Mesoscopic Semiconductor Billiard"
A.P. Micolich, **R.P. Taylor**, J.P. Bird, R. Newbury, Y. Aoyagi and T. Sugano
Proceedings of "The 11th International Conference on Superlattices, Microstructures and Microdevices", Hurgarda, Egypt, 1998
Published: *Superlattices and Microstructures* **25** 157 (1999) (REFEREED)

99. "Scale Factor Mapping of Self-similarity in Semiconductor Billiards"
R.P. Taylor, A.P. Micolich, R. Newbury, T.M. Fromhold, C.R. Tench, J.P. Bird and J. Cooper
Proceedings of "The 1998 Conference on Optoelectronic and Microelectronic Materials and Devices", Perth, Australia.
Published: *IEEE Journal* ISBN 0-7803-4513-4, 475 (1999) (REFEREED)

100. "Temperature Dependent Fractal Electron Transmission in Mesoscopic Billiards"
A.P. Micolich, **R.P. Taylor**, J.P. Bird, R. Newbury, Y. Aoyagi and T. Sugano
Proceedings of "The 1998 Conference on Optoelectronic and Microelectronic Materials and Devices", Perth, Australia.
Published: *IEEE Journal* ISBN 0-7803-4513-4, 471 (1999) (REFEREED)

101. "Physical Realisation of Weierstrass Scaling in a Soft-wall Antidot Billiard"
A.P. Micolich, **R.P. Taylor**, T.M. Fromhold, C.R. Tench and R. Newbury
Proceedings of "The 1998 Conference on Optoelectronic and Microelectronic Materials and Devices", Perth, Australia.
Published: *IEEE Journal* ISBN 0-7803-4513-4, 468 (1999) (REFEREED)

102. "Observation of Fractal Conductance Fluctuations over Three Orders of Magnitude"
R.P. Taylor, A.P. Micolich, R. Newbury, T.M. Fromhold and C.R. Tench
Proceedings of "The 8th Gordon Godfrey Workshop on Condensed Matter Physics", Sydney, Australia, 1998
Published: *Australian Journal of Physics*, **52** 887 (1999) (REFEREED)

103. "Chaotic Ray Dynamics and Fast Optical Switching in Micro-cavities with a Graded Refractive Index"
P.B. Wilkinson, T.M. Fromhold, C.R. Tench, **R.P. Taylor**, A.P. Micolich and R. Newbury
Proceedings of "The 11th International Conference on Hot Carriers in Semiconductors" Kyoto, Japan, July 1999.
Published: *Physica B* **272** 484 (1999) (REFEREED)

104. "Voltage and Temperature Limits for the Operation of a Quantum Dot Ratchet"
H. Linke, Hongqi Xu, A. Lofgren, Weidong Sheng, A. Svensson, P. Omling, P.E. Lindelof, R. Newbury and **R.P. Taylor**
Proceedings of "The 11th International Conference on Hot Carriers in Semiconductors" Kyoto, Japan, July 1999.
Published: *Physica B* **272** 61 (1999) (REFEREED)

105. "Comment on Fractal Conductance Fluctuations in a Soft Wall Stadium and a Sinai Billiard"
R.P. Taylor, A.P. Micolich, T.M. Fromhold and R. Newbury
Published: *Physical Review Letters* **83** (5) 1074 (1999) (REFEREED)

106. "Experimental Tunnelling Ratchet"

H. Linke, T.E. Humphrey, A. Lofgren, A.O. Sushkov, R. Newbury, **R.P. Taylor** and P. Omling
Published: *Science* **286** 2314 (1999) (REFEREED)

107. "Tunnelling Ratchets"
T.E. Humphrey, H. Linke, A. Lofgren, R. Newbury, P. Omling, A. Sushkov and **R.P. Taylor**
Proceedings of "The American Physical Society Annual Meeting", Minneapolis, U.S.A., 2000
American Physical Society Bulletin, **45** 861, 2000 (UNREFEREED, EXTENDED ABSTRACT)

108. "Tunnelling Ratchets"
T. E. Humphrey, **H. Linke**, A. Löfgren, R. Newbury, P. Omling, A. Sushkov, and R.P. Taylor
Proceedings of "The New Zealand and Australian Institutes of Physics Annual Condensed Matter Physics Meeting", (*Wagga'2000*), Wagga, Australia, 2000) (UNREFEREED, EXTENDED ABSTRACT)

109. "A Physical Explanation for the Origin of Self-similar Magnetoconductance Fluctuations in Semiconductor Billiards"
C.R. Tench, T.M. Fromhold, P.B. Wilkinson, M.J. Carter, **R.P. Taylor,** A.P. Micolich and R. Newbury
Proceedings of "The 9th International Conference on Modulated Semiconductor Systems" Fukuoka, Japan, July, 1999
Published: *Physica E* **7** 726 (2000) (REFEREED)

110. "Temperature and Size Dependence of Fractal MCF in Semiconductor Billiards"
A.P. Micolich, **R.P. Taylor**, J.P. Bird, R. Newbury, H. Linke, Y. Aoyagi and T. Sugano
Proceedings of "The 3nd International Conference on Low Dimensional Structures and Devices", Antalya, Turkey, 1999.
Published: *Microelectronics Engineering* **51-52** 241 (2000) (REFEREED)

111. "The Weierstrass function as a Model of Self-similarity in a Semiconductor Sinai Billiard"
A.P. Micolich, **R.P. Taylor**, R. Newbury, T.M. Fromhold and C.R. Tench
Published: *Europhysics Letters* **49** 417 (2000) (REFEREED)

112. "Stacked Billiards: Examining the Effect of Soft-wall Potential Profile on Fractal Conductance Fluctuations"
A.P. Micolich, **R.P. Taylor**, A.G. Davies, J.P. Bird, R. Newbury, T.M. Fromhold, A. Ehlert, H. Linke, L.D. Macks, W.R. Tribe, E.H. Linfield and D. A. Ritchie
Proceedings of "The American Physical Society Annual Meeting", Seattle, U.S.A., 2001
American Physical Society Bulletin, 2001 (UNREFEREED, EXTENDED ABSTRACT)

113. "The Evolution of Fractal Patterns During a Classical-Quantum Transition"
R.P. Taylor, A.P. Micolich, R. Newbury, A. Ehlert, A.G. Davies, L.D. Macks, H. Linke, T.M. Fromhold, W.R. Tribe, E.H. Linfield and D. A. Ritchie
Proceedings of "The American Physical Society Annual Meeting", Seattle, U.S.A., 2001
American Physical Society Bulletin, 2001 (UNREFEREED, EXTENDED ABSTRACT)

114. "Semiconductor Billiards: a Controlled Environment to Study Fractals"
R.P. Taylor, A.P. Micolich, R. Newbury , T.M. Fromhold, A. Ehlert , A.G. Davies, L.D Macks, C.R. Tench, J.P. Bird, R. H. Linke, W.R. Tribe, E.H. Linfield and D.A. Ritchie
Published: *Physica Scripta* **T90** 41 (2001) (REFEREED)

115. "Electron Quantum Ratchets"
H. Linke, P. Omling, T.E. Humphrey, A. Lofgren, R. Newbury, A.O. Sushkov and **R.P. Taylor**
Proceedings of The 25th International Conference on the Physics of Semiconductors, Japan, 2000
Published: World Scientific (available on CDROM) (2001) (INVITED & REFEREED)

116. "Chaos in Quantum Ratchets"
H. Linke, T.E. Humphrey, **R.P. Taylor** and R. Newbury
Published: *Physica Scripta* **T90** 54 (2001) (REFEREED)

117. "Electromagnetic Wave Chaos in Gradient Refractive Index Optical Cavities"
P.B. Wilkinson, T.M. Fromhold, **R.P. Taylor** and A.P. Micolich
Published: *Physical Review Letters* **86** 5466 (2001) (REFEREED)

118. "The Evolution of Fractal Patterns during a Classical-Quantum Transition"
A.P. Micolich, **R.P. Taylor**, A.G. Davies, J.P. Bird, R. Newbury, T.M. Fromhold, A. Ehlert, H. Linke, L.D Macks, W.R. Tribe, E.H. Linfield, D.A. Ritchie, J. Cooper, Y. Aoyagi and P.B. Wilkinson
Published: *Physical Review Letters* **87** 036802 (2001) (REFEREED)

119. "A Compact Fourth-Order Finite Difference Method For Solving Differential Equations"
P.B. Wilkinson, T.M. Fromhold, C. R. Tench**, R.P. Taylor** and A.P. Micolich
Published: *Physical Review E* **64** 047701-1-4 (2001) (REFEREED)

120. "Effects of Geometric Wave Chaos on the Electromagnetic Eigenmodes of Gradient-index Optical Cavity"
P.B. Wilkinson, T.M. Fromhold, **R.P. Taylor** and A.P. Micolich
Published: *Physical Review E* **64** 026203 (2001) (REFEREED)

121. "Semiconductor Billiards: a Controlled Environment to Study Fractals"
R.P. Taylor, A.P. Micolich, R. Newbury, T.M. Fromhold, A. Ehlert , A.G. Davies, L.D Macks, C.R. Tench, J.P. Bird, R. H. Linke, W.R. Tribe, E.H. Linfield and D.A. Ritchie
Invited contribution to the Nobel Foundation book *Y2K Quantum Chaos*,
Published: World Scientific (Singapore) (ISBN 981 02 4711-7) and The Royal Swedish Academy of Sciences, 41 (2001) (INVITED)

122. "The Dependence of Fractal Conductance Fluctuations on Soft-wall Profile in a Double-2DEG Billiard"
A.P. Micolich, **R.P. Taylor**, A.G. Davies, T.M. Fromhold, R. Newbury, A. Elhert, H. Linke, L.D Macks, W.R. Tribe, E.H. Linfield and D.A. Ritchie
Proceedings of "The 14th International Conference on the Physics of Two Dimensional Systems", Prague, Czech Republic, July 2001.
Published: *Physica E* **12** 841 (2002) (REFEREED)

123. "Discrete Energy Level Spectrum Dependence of Fractal Conductance Fluctuations in Semiconductor Billiards"
A.P. Micolich, **R.P. Taylor**, A.G. Davies, J.P. Bird, A. Ehlert, T.M. Fromhold, R. Newbury, H. Linke, L.D Macks, W.R. Tribe, E.H. Linfield and D.A. Ritchie
Proceedings of "The 10th International Conference on Modulated Semiconductor Structures", Linz, Austria, July 2001
Published: *Physica E* **13** 683-686 (2002) (REFEREED)

124. "The Dependence of Fractal Conductance Fluctuations on Semiconductor Billiard Parameters"
A.P. Micolich, **R.P. Taylor**, R. Newbury, J.P. Bird, T.M. Fromhold, A.G. Davies, A. Elhert, L.D Macks, W.R. Tribe, H. Linke, E.H. Linfield, D.A. Ritchie, J. Cooper and Y. Aoyagi
Proceedings of "The 12th International Conference on Nonequilibrium Carrier Dynamics in Semiconductors (HCIS-12)"
Published: *Physica B* **314** 477 (2002) (REFEREED)

125. "Quantum Ratchets Act as Quantum Heat Pumps"
H. Linke, T.E. Humphrey, **R.P. Taylor**, A.P. Micolich and R. Newbury
Proceedings of the 12th International Conference on Nonequilibrium Carrier Dynamics in Semiconductors (HCIS-12).
Published: *Physica B* **314** 464 (2002) (REFEREED)

126. "Quantum Ratchets and Quantum Heat Pumps"
H. Linke, T.E. Humphrey, P.E. Lindelof, A. Loffgren, R. Newbury, P. Omling, A.O. Sushkov, **R.P Taylor** and H. Xu
Published: *Applied Physics A* **75** 237 (2002) (REFEREED)

127. "The Dependence of Fractal Conductance Fluctuations on Soft-wall Profile in a Double-layer Billiard"
A.P. Micolich, **R.P. Taylor**, A.G. Davies, T.M. Fromhold, H. Linke, R. Newbury, A. Elhert, L.D Macks, W.R. Tribe, E.H. Linfield and D.A. Ritchie
Published: *Applied Physics Letters* **80** 4381 (2002) (REFEREED)

128. "Reversible Quantum Brownian Heat Engines for Electrons"
T.E. Humphrey, R. Newbury, **R.P Taylor** and H. Linke

Published: *Physical Review Letters* **89** 116801 (2002) (REFEREED)

129. "Dependence of Fractal conductance Fluctuations on Semiconductor Billiard Parameters"
A.P. Micolich, **R.P. Taylor**, R. Newbury, J.P. Bird, T.M. Fromhold, A.G. Davies, L.D Macks, A. Elhert, H. Linke, W.R. Tribe, E.H. Linfield, D.A. Ritchie, J. Cooper and Y. Aoyagi
Proceedings of "The Australian Institute of Physics Congress", Sydney, July 2002.
Published: "15th Biennial Congress", Australian Institute of Physics, 367 (2002) (REFEREED)

130. "Fractal Conductance Fluctuations in "Hard-wall" InGaAs/InP Billiards"
C. Marlow, **R.P. Taylor,** H. Linke and T. Martin
Proceedings of the Annual American Physical Society Meeting, Austin Texas, March 2003.
Published: Bulletin of the American Physical Society **48** 101 (2003) (UNREFEREED, EXTENDED ABSTRACT)

131. "Fractal conductance Fluctuations in single and double-layer billiards"
R.P. Taylor, A.P. Micolich, H. Linke, A.G. Davies, T.M. Fromhold, R. Newbury, A. Elhert, L.D Macks, W.R. Tribe, E.H. Linfield and D.A. Ritchie
Proceedings of "The 26th International Conference on Physics and Semiconductors", Edinburgh, July 2002.
Published: Institute of Physics Conference Series **171** (2003) (available on CD) (REFEREED)

132. "Fractal Transport Behaviour in Coupled-Dot Systems"
Y. Ochiai, L. Lin, N. Aoki, Y. Iwase, K. Ishibashi, A.P. Micolich, **R.P. Taylor** and J.P Bird
Proceedings of "Localization 2002" Tokyo, 2002
Accepted for publication (REFEREED)

133. "Geometry Independence of Fractal Ballistic Processes"
R.P. Taylor, T.P. Martin, A.P. Micolich, H. Linke, A.G. Davies, R. Newbury, and E.H. Linfield
Proceedings of "NanoMes 2003", Tempe, February 2003.
Accepted for publication in *Physica E* (REFEREED)

134. "A Review of Fractal Conductance Fluctuations in Ballistic Semiconductor Devices"
R.P. Taylor, R. Newbury, A.P. Micolich, T.M. Fromhold, H. Linke, A.G. Davies, T.P. Martin and C. Marlow
Invited chapter to the book *Electron Transport in Quantum Dots*, Ed. J.P. Bird, Kluwer Academic/Plenum (2003) (INVITED)

135. "Generic Fractal Behaviour of Ballistic Devices"
R.P. Taylor, R. Newbury, A.P. Micolich, A.G. Davies, T.M. Fromhold, H. Linke, L.D Macks, W.R. Tribe, E.H. Linfield, D.A. Ritchie and T.P. Martin
Proceedings of The 2002 Conference on Optoelectronic and Microelectronic Materials and Devices, Sydney, December 2002.
Accepted for publication in the IEEE journal (INVITED & REFEREED)

136. "Symmetry of Two Terminal Non-linear Electrical Current"
A.Lofgren, C.A Marlow, I. Shorubalko, **R.P. Taylor,** L. Samuelson and H. Linke,
To be published in *Physical Review Letters* (REFEREED)

137. "Insensitivity of Interference Phenomena to Wall Properties in Ballistic Devices"
T.P. Martin, C.A. Marlow, **R.P. Taylor**, H. Linke, G.D.R.Hall, I. Shorubalko, I. Maximov, W. Seifert, L. Samuelson, and T.M. Fromhold
To be published in *Superlattices and Microstructures* (REFEREED)

138. "Symmetry of Non-linear Electronic Conduction"
C.A. Marlow, A.Lofgren, I. Shorubalko, **R.P. Taylor**, L. Samuelson and H. Linke,
To be published in *Superlattices and Microstructures* (REFEREED)

139. "Mapping the Wall Profile of Etched GaInAs/InP Billiards"
T.P. Martin, **R.P. Taylor**, H. Linke, C.A. Marlow, G.D.R.Hall, I. Shorubalko, I. Maximov, W. Seifert, L. Samuelson, and T.M. Fromhold
Submitted to *Applied Physics Letters* (REFEREED)

140. "Sensitivity of Quantum Interference Effects to the Wall Profile of GaInAs/InP Billiards"
C.A. Marlow, **R.P. Taylor**, H. Linke, T.P. Martin, I. Shorubalko, I. Maximov, W. Seifert , L. Samuelson and T.M. Fromhold
Submitted to *Applied Physics Letters* (REFEREED)

141. "Fractal Conductance Fluctuations: Beyond the Semiclassical Picture"

A.P. Micolich, **R.P. Taylor,** T.P. Martin, R. Newbury, T.M. Fromhold, A.G. Davies, H. Linke, W.R. Tribe, L.D. Macks, C.G. Smith, E.H. Linfield and D.A. Ritchie.
Submitted to *Physical Review B* (REFEREED)

ii) Fractals in the Visual Sciences

142. "Chaos in Modern Art?"
R.P. Taylor
Published: *Physics World*, 76 (November 1997) (COMMISSIONED)

143. "Splashdown"
R.P. Taylor
Published: *New Scientist* **2144** 30 (1998) (INVITED)

144. "Greater Neuronal Cell Density Occurs in Females in the Language-associated Planum Temporale"
J.A. Harasty, G.M. Halliday, X. Phung and **R.P. Taylor**
Published: *Proceedings of the Australian Neuroscience Society* **10** 53 1SBN 1034 1034-3237 (1999) (UNREFEREED, EXTENDED ABSTRACT)

145. "Fractal Analysis of Pollock's Drip Paintings"
R.P. Taylor, A.P. Micolich and D. Jonas
Published: *Nature* **399** 422 (1999) (REFEREED)

146. "The Story of a Chaotic Pendulum: Where Science and Art Meet"
R.P. Taylor, A.P. Micolich and D. Jonas
Published: *The Physicist* **36** (3) 93 (1999) (cover picture and feature article) (INVITED)

147. "Fractal Expressionism: A Scientific Analysis of Jackson Pollock's Drip Paintings"
R.P. Taylor, A.P. Micolich and D. Jonas
Published: *Physics World*, 25 (October 1999) (cover picture and feature article) (COMMISSIONED)

This article was also published on-line in Pass Magazine (University of Cambridge, http://www.pass.maths.org.uk)

148. "The Use of Science to investigate Jackson Pollock's Drip Paintings"
R.P. Taylor, A.P. Micolich and D. Jonas
Published: Invited contribution to "Art and the Brain", *Journal of Consciousness Studies* **7** (8-9) 137 (2000) (INVITED & REFEREED)

149. "From Science To Art and Back"
R.P. Taylor
Published*: Science* on line: http://nextwave.sciencemag.org/cgi/content/full/2001/04/25/1 (2001) (INVITED CAREER ESSAY)

150. "Fractals: A Resonance Between Surrealist Art and Nature"
R.P. Taylor, B.R. Newell, B. Spehar and C.W.G. Clifford
Invited contribution to proceedings of "The 5th International Conference on the Interdisciplinary Study of Symmetry (ISIS)", Sydney 2001.
Published: *Symmetry: Art and Science*, ISIS Journal (ISBN 865-4824) **1-2**, 194 (2001) (INVITED EXTENDED ABSTRACT)

151. "Pollock's Fractals Unite Art and Science"
R.P. Taylor
Proceedings of the Sigma Xi Forum, Raleigh, USA, 2001.
American Scientist, June/July Issue 2002 (UNREFEREED, EXTENDED ABSTRACT)

152. "The Construction of Pollock's Fractal Drip Paintings"
R.P.Taylor, A.P.Micolich and D.Jonas
Published: *Leonardo* **35** 203 (2002) (REFEREED)

153. "Architect Reaches for the Clouds"
R.P. Taylor
Published: *Nature* **410** 18 (2001) (COMMISSIONED)

154. “Spotlight on a Visual Language”
R.P. Taylor
Published: *Nature* **415** 961 (2002) (INVITED)

155. “Fractal Design Strategies For Enhancement of Knowledge Work Environments”
J.A. Wise and **R.P. Taylor**
Published: *Proceedings of The Human Factors and Ergonomics Society Meeting (2002),* Baltimore, October 2002 (REFEREED)

156. "Order in Pollock's Chaos"
R.P. Taylor
Published: *Scientific American*, **287** 84-89 December 2002 (COMMISSIONED)

157. “Ordine nel caos di Pollock”
R.P. Taylor
Published: Le Scienze, **413** 88 (2002) (INVITED)

158. "Fractal Expressionism - Where Art Meets Science"
R.P. Taylor
Invited Chapter to the book *Art and Complexity*, Ed. J. Casti and A. Karlqvist, Elsevier Science, Amsterdam (2003) (INVITED)

159. “Fractals: A Resonance Between Art and Nature”
R.P. Taylor, B. Newell, B. Spehar and C. Clifford
Invited chapter to the book *The Visual Mind Part 2: Art and Mathematics*
Ed. M. Emmer, (Springer, 2004) (INVITED)

160. "Pollock's Fractals "
R.P. Taylor
Published: Letter, *Scientific American*, 6th April 2003 (INVITED)

161. “Universal Aesthetic of Fractals”
B. Spehar, C.W.G. Clifford, B.R. Newell and **R.P. Taylor**
Chaos and Graphics, Elsevier Press, **27** 813 (2003) (REFEREED)

162. “The Visual Complexity of Pollock's Dripped Fractals”
R.P. Taylor, B. Spehar, C.W.G. Clifford and B.R. Newell.
Proceedings of "The International Conference on Complex Systems (2002), New Hampshire, July 2002. Accepted for Publication (2003) (REFEREED)

163. “Levy Flights”
R.P. Taylor
Invited Essay in the *Encyclopedia of Non-linear Science*, Ed. Alywn Scott, to be published by Fitzroy-Dearborn, London, (2003) (INVITED)

164. "Second Nature: Fractals from Pollock to Gehry "
R.P. Taylor
Accepted for publication in *New Architecture* (INVITED)

165. “Fractal Dimension of Landscape Silhouette as a Predictor of Landscape Preference”
C.M. Hagerhall, T. Purcell and **R.P. Taylor**,
To be published in the *Journal of Environmental Psychology* (REFEREED)

166. “Perceptual and Physiological Response to the Visual Complexity of Jackson Pollock’s Dripped Fractals”
R.P. Taylor, B. Spehar, J.A. Wise, C.W.G. Clifford, B.R. Newell, C.M. Hagerhall, T. Purcell and T.P. Martin
To be published in *The journal of Nonlinear Dynamics, Psychology, and Life Sciences* (REFEREED)

167. " Mondrian, Pollock and Nature: Recent Scientific Investigations"
R.P. Taylor
Accepted for publication in a special edition of *Chaos and Complexity Letters* (INVITED And REFEREED)

168. " Perceptual, Physiological and Oculomotor Responses to Fractal Patterns "
R.P. Taylor

Accepted for publication in the book *Mathematics and Culture* (INVITED), to be published by Springer

169. "Pollock's Chaos: Using Nature's Geometry to Authenticate Art"
R.P. Taylor
Invited submission to the *International Foundation for Art Research Journal* (INVITED AND REFEREED)

170. "Fractal Architecture: Engineering Artificial Environments Based on Perceptual Responses"
R.P. Taylor
Invited contribution to the book "Fractal Foundations for 21st Century Architecture and Environmental Design" (INVITED)