

RESEARCH REPORT OF THE
**SIR JOHN WALSH
RESEARCH INSTITUTE**

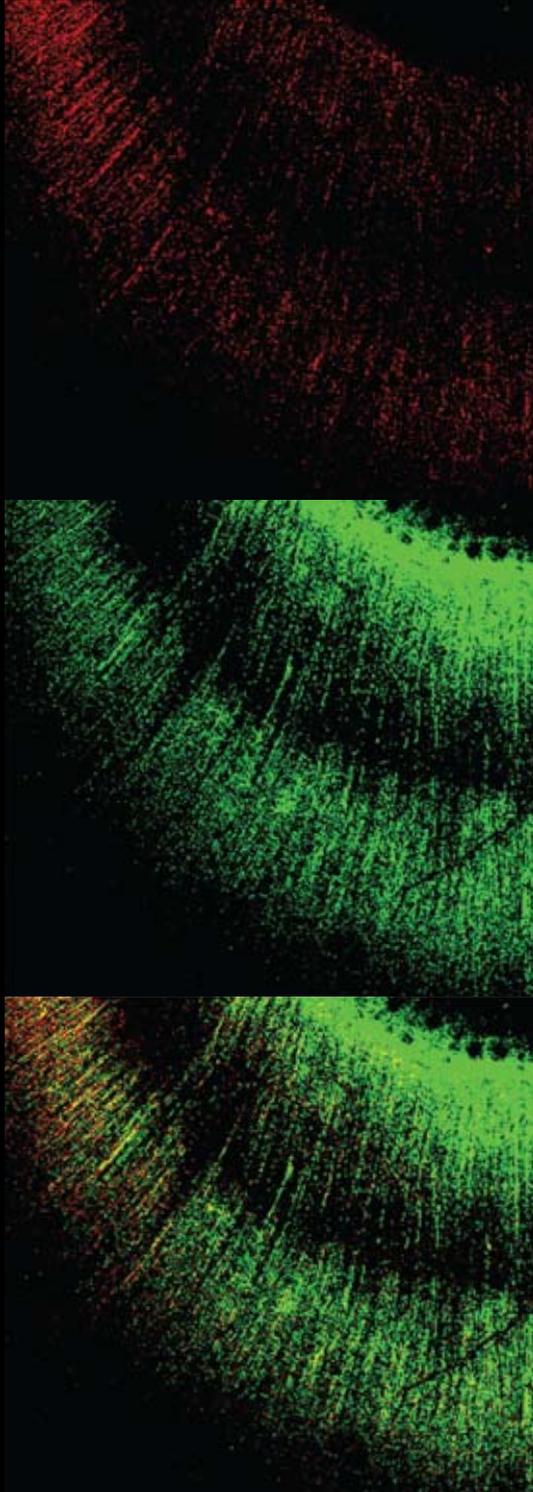


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Introduction from the Dean



It is an honour to write this introduction to the first *Research Report* of the Sir John Walsh Research Institute. The Institute within the Faculty of Dentistry at the University of Otago provides a focus for dental research not only within New Zealand but also within the Pacific. The importance of oral health to overall general health and well-being is becoming increasingly recognised and as the country's only comprehensive dental school, it is appropriate that the Institute, which will provide the research base underpinning the professions of dentistry in New Zealand over the ensuing decades, be housed at the University of Otago. The Institute draws together the research strengths within the Faculty and groups these initially into five *Research Programmes* – Oral Biomechanics (including Dental Biomaterials, Oral Implantology and Forensic Dentistry), Dental Education Research, Oral Epidemiology and Public Health, Molecular & Immuno-Oralpathology and Molecular Oral Microbiology. The structure of the Institute however, is flexible and while these five programmes represent the current research strengths within the Faculty, they are not fixed and new programmes will evolve as new research themes develop and as the needs of the professions, and of the country, change.

The development of the Sir John Walsh Research Institute is a major new venture not only for the University of Otago but also for dentistry in New Zealand and it is pleasing to note the strong support from the New Zealand Dental Association. The formation of the Institute however, would not have been possible without the foresight and support of Professor Geoffrey White who, as Deputy Vice-Chancellor Research at the University of Otago, provided the initial seeding funds for the Institute and at the same time was instrumental in convincing the University of its value and need. Equally, the Institute owes a debt of gratitude to the international advisory committee, chaired by Professor John Greenspan of the University of California San Francisco, who were instrumental in guiding the Faculty through the difficult path of establishing a dental research institute with an international reputation and focus.

The future of the Sir John Walsh Research Institute however lies in the hands, not only of members of the Faculty, but also of all members of the dental professions in New Zealand. With your continuing support and commitment to dental research in this country, the oral health, and hence general health, of all New Zealanders will be based on a firm footing.

I wish Professor Jules Kieser and all those involved in the Institute all the best for the future and congratulations on your achievement.



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The Sir John Walsh Research Institute



REPORT BY THE DIRECTOR

Research is at the core of all innovation, whether it is basic discovery, the search for answers to clinical questions, or applied solutions to societal problems. This was the basis of all the advances of the late Sir John Walsh in his drive to improve the oral health of New Zealanders. It is this vision that drives the Sir John Walsh Research Institute today as it strives to maintain and strengthen excellent research.

Current research includes basic, curiosity-driven investigation, clinical research, contract research, policy development and strategic planning, all carried out with the intention to influence the thinking of others. It is from sharing ideas and results, and publication, that we communicate those discoveries that improve public health within the profession we serve. This applies equally whether it is fundamental research or research into societal problems and needs.

Attracting funding is one indicator of success, but the distinction of our research enterprise can best be evidenced by our publication output, citations, professional fellowships and honours. These together with our ability to attract postgraduate students and to present our research at symposia and conferences, is indirectly measured by the Performance Based Research Fund. In the most recent PBRF round the University of Otago is the top-ranked University for research in New Zealand, and the Faculty of Dentistry has a high proportion of staff who were ranked an A in the most recent evaluation.

Within the pages of this, our first Report, you will see examples of exciting research that is having a large impact on the world of clinical dentistry, technology and oral health. You will also see the wide net of collaborative research that your colleagues have cast across Australasia and further afield. This has enabled us to stay competitive and at the forefront of the various disciplines that make up our Faculty. Clearly all our students directly benefit from these efforts, through research informed teaching, through summer and elective projects, and through our postgraduate programmes. All of these ensure that our students are imbued with the innovative, questioning spirit that we foster and treasure.

ACKNOWLEDGEMENTS

I want to personally thank all the staff and students of the Faculty of Dentistry, for their enthusiastic and loyal support of the Sir John Walsh Research Institute. I also want to express my gratitude to the Members of the Board and various committees that provide the Institute with its governance, and the Dean, Professor Gregory Seymour, for his unqualified and purposeful support. The administration of research within the Institute was greatly facilitated by Dr Eric Lord. Finally a very big thank-you to Sharon Chappelow, Sharon Carroll-Thompson and Margaret Guthrie, whose practical skills assured the success of the production of this report, as well as Professor Murray Thomson who provided much valued editorial assistance.

Jules Kieser

Sir John Patrick Walsh KBE



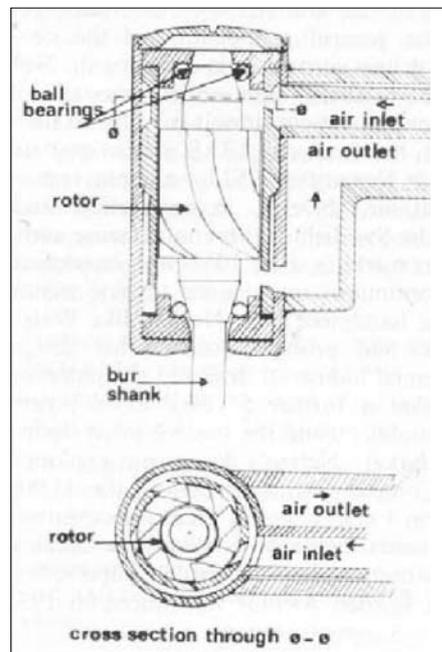
MUCH GAIN AND MINIMISED PAIN

Sir John Walsh made such a remarkable contribution to dentistry in New Zealand that Chapter 8 of Tom Brooking's "A History of Dentistry in New Zealand" is entitled the "Walsh Era 1947-1972." After graduating with a first class honours degree in dentistry (followed by a medical degree), and then serving as a medical officer in the Royal Australian Air Force, this self-described "brash Australian" was appointed as the 3rd Dean of the School of Dentistry at the University of Otago in 1946. Walsh's appointment advanced dentistry at many levels. He served as a spokesperson for dentistry at the World Health Organisation, led a campaign that overcame vociferous opposition to fluoridate water supplies in New Zealand cities, and succeeded after 10 years of struggle with reluctant university authorities (and even more reluctant government) to build the iconic glass curtain building that now houses the Faculty of Dentistry and bears his name. Under his leadership, the Faculty of Dentistry obtained the highest international standards by broadening its clinical and scientific base and reaching out to the dental profession and the community. Walsh edited the New Zealand Dental Journal for several years and had a reputation for being extremely scathing about dental practices that equipped too many New Zealand adults with "false teeth faces" in the mid-20th century. Walsh was a powerful advocate of research. Staff members in the Faculty of Dentistry were encouraged to undertake PhD study, and the School of Dentistry set out to "grow" its own researchers by introducing the highly successful MDS graduate programme. This focus on research was achieved with support of Walsh's ally, Sir Charles Hercus in the Medical School (also a dental graduate). After more than 50 years, the MDS degree has been replaced by the Doctorate in Clinical Dentistry (DClinDent). Most importantly, the change will increase the research experience and clinical expertise of graduates in a world where biological knowledge and its impact on clinical practice are changing at an unprecedented rate. This initiative to improve and more fully inform dental practice through research would undoubtedly have been endorsed by Walsh.

Sir John Walsh's contribution to the development of the modern high-speed dental handpiece was one of his most significant but least well-known achievements. Electric drills introduced near the beginning of the First World War were inefficient and, by operating at only about 3000 rpm, caused considerable discomfort to patients. While testing the hearing of Australian airmen discharged from service at the end of World War II, Walsh not only identified frequencies that caused pain but also those that did not. This led to the hypothesis that the vibrational frequencies imparted by dental drills rotating at sufficiently high speeds would minimise patient discomfort. With the assistance of H.F. Simmons from the University of Otago Department of Physics, an existing air-powered low-speed drill was modified to operate initially above the 42,000 rpm vibrational threshold and then at 60,000 rpm. In 1947, Walsh persuaded the Ministry of Science and Industry to underwrite the development of the air turbine handpiece at the Dominion Physics Laboratory in Lower Hutt. By 1949, a prototype was made available to Walsh, who then obtained the results that contributed to his DDSc from the University of Melbourne and to the issue of a New Zealand patent. Although the prototype overcame the pain problem and required minimal operator force to work efficiently, its high-pitched noise, excessive exhaust of air into the patient's mouth, and the too-frequent seizure of its primitive bearings (due to overheating) made it difficult to obtain further support from government or commercial sources. In 1952, Walsh's research on the air turbine handpiece ceased due to lack of funding. American and Swedish research had overcome the technical problems by about 1955 and, in 1957, the Borden Airtor was marketed by the Dentists' Supply Company. R.J.

Nelson, who had produced a water- and powered cooled contra-angle handpiece, was then promoted (with the editorial support of the Journal of one of his sponsors, the American Dental Association) as being solely responsible for the development of the high-speed drill. The precedence of Walsh's development of a high-speed air turbine handpiece that closely resembles the modern-day device can be gleaned from the pages of the *New Zealand Dental Journal* and a summary in the *British Dental Journal* (136, 469-472, 1974). The parallel drawn by Tom Brooking on the Walsh and Nelson contributions to dentistry with those of Richard Pearse and the Wright brothers to powered flight seems quite apt.

Walsh's attitude to research was very modern in its inclusiveness, while many of the barriers he faced in bringing its products into the clinic remain difficult to overcome. Walsh took a multidisciplinary approach to problems; he recruited the best people and obtained the best from them; he understood the risk inherent in cutting-edge research and didn't expect research or commercialization to be easy; and he came to understand that the perspectives of companies and politicians are often myopic. Not fazed by the disappointment of being unable to advance the high-speed handpiece further; Walsh worked hard to expand research activity within the Faculty of Dentistry by attracting research funding, establishing the Biochemical Research Unit of the Dental School in 1960, and supporting an electron microscopy suite. It is therefore fitting that the University of Otago is acknowledging his contribution to research in dentistry by supporting the establishment of the Sir John Walsh Research Institute in the Faculty of Dentistry. It is the first Research Institute at the University of Otago. Its roles in research and communication with the profession and wider community will seek to improve the oral health of New Zealanders, a modernisation of Walsh's aspiration of giving people "teeth for life".



A patent drawing of the air turbine handpiece design



Prototype handpieces

Publication Numbers 2003-2008

		2003	2004	2005	2006	2007	2008
Dentistry	Conference Contribution – Other			0.5			0.3
	Conference Contribution – Refereed		1.0	0.5	1.0	2.2	4.5
	Journal Article – Other					6.8	1.0
	Journal Article – Refereed			6.5	9.5	4.0	3.0
Dentistry Total			1.0	7.5	10.5	13.0	8.9
Oral Diagnostic & Surgical Sciences	Book Chapter			1.0	0.5		1.0
	Conference Contribution – Other	0.3	0.8	1.3	1.6	1.3	8.5
	Conference Contribution – Refereed	1.2	4.3		0.2	1.0	6.3
	Creative work						1.0
	Journal Article – Other		0.5	1.0	1.0	2.7	2.0
	Journal Article – Refereed	3.3	6.4	6.0	4.7	5.2	4.4
Oral Diagnostic & Surgical Sciences Total		4.8	12.1	9.4	8.0	10.1	23.2
Oral Rehabilitation	Book Chapter	1.5					1.1
	Conference Contribution – Other		1.2	1.0	0.3	6.5	18.5
	Conference Contribution – Refereed	8.5	0.7	5.8	1.4	5.6	2.4
	Journal Article – Other		0.5			3.4	4.0
	Journal Article – Refereed	12.7	11.2	14.2	8.4	20.8	28.0
	Other work			1.0		1.0	
	Thesis				1.0		
Oral Rehabilitation Total		22.7	13.5	21.9	11.1	37.4	54.1
Oral Sciences	Book				1.0		
	Book Chapter	2.5		1.0	1.0		0.4
	Conference Contribution – Other	10.0	16.4	21.0	14.2	11.4	22.1
	Conference Contribution – Refereed	8.0	2.2	5.8	9.9	22.3	27.5
	Creative work		1.0				
	Journal Article – Other	1.0	1.0	2.0	2.0	4.4	3.8
	Journal Article – Refereed	21.2	45.8	28.4	24.2	25.5	26.9
	Other work	1.2	1.0		2.0		
Thesis			1.0				
Oral Sciences Total		43.8	67.3	59.1	54.4	63.6	80.8

Source: Publications outputs office: Research and Enterprise Office University of Otago

Research Programmes

Biomechanics & Oral Implantology

Programme Leaders: Professor Michael Swain and Professor Jules Kieser

INTRODUCTION

Clinical dentistry is somewhat of an art, combining rules on evaluating and choosing different technologies, knowledge about oral function, materials and designs, together with experience of what works and what does not. However, as in other types of art, its success depends greatly upon an understanding of the scientific basis of the constituent parts of the system.

Biomechanics has become a major influence in dental research in the last two decades. From using advanced mathematical analyses to predict failure patterns in fillings and implant designs, to the development of new clinical treatment paradigms, biomechanics has made possible major advances in dentistry and its allied professions. Fundamental design concepts and mechanical guiding principles are keys to successful dental treatment in its broadest sense. Our research in this field continues to provide exciting and useful perspectives on the planning and execution of treatment modalities. Many problems in dentistry appear to be straightforward on the surface, but when investigated from first principles, these become deeper and more difficult, involving complex interactions between the living oral tissues and dental materials placed in or on them. Without an understanding the biomechanical environment, relatively simple, accepted protocols may in fact turn out to be ineffective and or impractical.

Our research covers a number of topics including 1) dental materials, 2) natural soft and hard tissues such as teeth and bone, 3) implantology and associated structures.

We collaborate extensively with groups both locally and internationally. Current collaborations include Dental Research Group at Victoria University in Wellington, The Children's Hospital Melbourne, The University of Queensland, The University of Sydney, University

of Western Australia in Australia, The University of Tokushima, Tsurumi University in Japan, The University of Zurich and The University of Geneva in Switzerland, The Technical University Hamburg Harburg in Germany and The University of Pardubice in the Czech Republic and The University of London in the UK.

CURRENT RESEARCH

Our research is focused on trying to define and understand the oral design environment. It examines the entire system, from basic structures such as bone, teeth and mucosa, to the design and manufacture of various materials used in dentistry. Major themes within this group include;

- the structure and material properties of oral tissues and their responses to biological forces
- failure mechanisms of implant supported prostheses
- adhesion and design features of modern dental restorations
- the structure of dentine and enamel in the tuatara
- enamel hypoplasia
- tongue pressure dynamics in the mouth
- sharp and blunt force injuries to craniofacial structures.

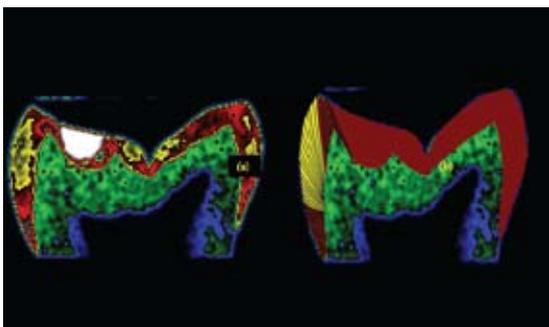
RESEARCH ACTIVITIES

Activity I. Dental Materials

Description: Evaluating specific issues associated with the range of dental materials from composite resin systems to advanced ceramics.

Aim: Provide basic information about these materials that enables a better basis for understanding usage in clinical settings.

Source(s) of funding: NZ Dental Research Foundation



Outcomes during 2007-2008: Work in this area continues to attract international attention and to be published in the top international journals: 8 papers were published.

Activity 2. Soft and hard tissue biomechanics and forensic biology

Description: Investigating the basic properties of skin, teeth and bone related to the craniofacial region and forensic issues.

Aims: Teeth and bone are special in that they preserve a record of their formation in the adult product. Hence, an examination of adult morphology can be used to reveal some of the processes that were involved, as well as some of the perturbations of such processes. This knowledge can then be linked to clinical findings that will hopefully result in better therapeutic outcomes. Our research has mainly focused on the structure and function of enamel in different species, forces generated during swallowing and the behaviour of skin and bones during traumatic events.

Source(s) of funding: Various but primarily the NZDA Research Foundation, ESR Capability Development Fund and the Foundation for Research Science and Technology.

Outcomes during 2007-2008: PhD thesis Ionut. Ichim; DCLinDent Theses Bhavia Singh, Dan Kennedy and Cath O'Shea; MSc Kelly Whittle, Brittany Wong, Shelley Kemp and Frances Daroux.

Activity 3. Implantology and associated superstructures

Description: We conduct both clinical and laboratory-based research relating to implant dentures and single-tooth implant crowns that aim to improve the oral health-related quality of life of an ageing population. We conduct laboratory-based research to identify and quantify the strain distribution in the human mandible as a result of misfit of fixed partial Implant -supported prosthesis. The clinical research undertaken includes the recall and clinical audit of all implant patients treated at the School from 1989 to 2008. Pre-clinical research in a large animal (sheep) model is currently focused on the histomorphometric and radiomorphometric quantification of osseointegration following modification of implant surfaces by various biomechanical, biological and biochemical approaches. Both unloaded, submerged and immediately-loaded, one-stage protocols have been tested in cortical (mandibular) and trabecular (femur) bone types; oral implants and bone replacement grafting materials have been tested together in the sheep maxillary sinus model. Quantification of peri-implant bone mineral density using micro-computerised tomography and nanoindentation is ongoing.

Aims: To develop outcomes related to developing an evidence-based treatment approach of reducing the delay between oral implant placement and loading with the prosthesis is internationally recognized in dentistry, to quantify the pre-load stress developed on the peri-implant bone and the prosthetic framework as a result of misfit using a recently developed mandible replica.

Source(s) of funding: NZDA Research Foundation; International Team for Oral Implantology ITI Switzerland; Straumann AG, Switzerland; NobelBiocare Australia; Southern Implants, South Africa. Korea Science and Engineering Foundation (KOSEF), Megagen Co Ltd., South Korea; Osstem Co. Ltd, South Korea; Neoss Australia Pty. Ltd. Australia; Keratec Ltd. New Zealand; Euroteknika France.

Outcomes during 2007-2008: Approximately 17 papers were published and several conference presentations were made. Completion of 3 DCLinDent theses (J Kim 2007, D Fitzgibbon & R Verma 2008), four conference presentations and two published papers.

KEY PERSONNEL

Professor Mike Swain
Professor Jules Kieser
Professor Mauro Farella
Assoc. Professor Alan Payne
Assoc. Professor Bernadette Drummond
Dr Vincent Bennani
Dr Warwick Duncan
Dr Andrew Quick
Dr Lihong He
Dr Ionut Ichim,
Mr Neil Waddell
Dr Rami Farah, funded by University of Otago Post-doc Scholarship (2007-2009)



Large animal research at Invermay

Dental Epidemiology and Public Health

Programme Leader: Professor W Murray Thomson

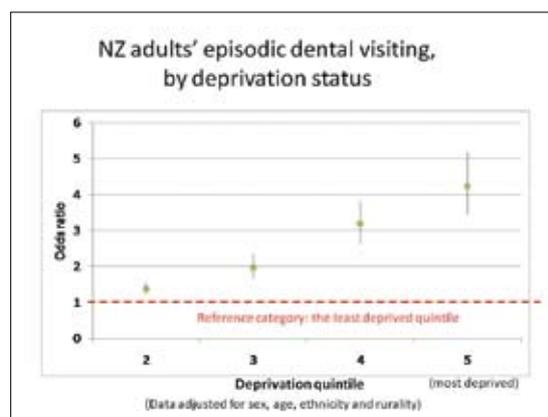
OVERVIEW

Our work has the two main strands of (1) *dental epidemiological research* and (2) *dental health services research*. Dental epidemiological research: in this work, we study the occurrence, determinants and natural history of the common oral conditions. To do this, we employ a number of standard dental epidemiological approaches (most notably the prospective cohort study and the cross-sectional survey) and techniques. Multidisciplinary collaboration has proven to be a very fruitful way of doing our work, as it combines the different strengths and knowledge bases of a number of researchers. *Dental health services research* (HSR): this work is concerned with how the dental healthcare system works, and the extent to which users are benefitting from it. Key activities are measuring oral health outcomes and increasing understanding of how (and why) people use (or do not use) dental services. Our group have played an important role in the development and epidemiological validation of new measures for child oral-health-related quality of life, working in collaboration with a number of overseas researchers. We are also rapidly developing our expertise and output in the field of dental workforce research.

KEY PERSONNEL AND COLLABORATIONS

Professor WM Thomson
Ms KC Morgaine
Mr JM Broadbent (funded by HRC grant 09/086C)
Ms DM Shearer (Funded by NIH grant R03DE018716)
Ms Marnie Reinfelds (funded by HRC grant)

Our collaborations are very important to the work and impact of the group. Current collaborations include institutions in New Zealand (Northland, Waikato, Taranaki, Capital Coast, Nelson-Marlborough and Otago District Health Boards and the Ministry of Health), Australia (the Universities of Adelaide and Melbourne), Canada (the University of Toronto), the USA (Duke University and the University of North Carolina), Britain (GKT Dental Institute, the University of London), and Brazil (University of Santa Catarina, Florianopolis).



RESEARCH ACTIVITIES

Activity 1. Life-course research in oral health (the Dunedin Study)

Description: Prospective observational research into the natural history of oral health and disease in a representative birth cohort now in adulthood

Aim: Unprecedented information on the natural history of oral health and disease

Source(s) of funding: US NIH, NZ HRC, Otago Medical Research Foundation

Outcomes during 2007-2008: Work in this area continues to attract international attention and to be published in the top international journals: 7 papers were published, and 9 conference presentations were made.

Activity 2. Other dental epidemiological research

Description: Dental epidemiological studies in NZ and overseas.

Aims: Various – enhancement of the knowledge base for dental epidemiology, dental public health, and clinical practice.

Source(s) of funding: Various – including NZ Ministry of Health, NZDA Research Foundation, the Health Research Council of NZ, Dental Council of NZ.

Outcomes during 2007-2008: 3 papers were published and 2 conference presentations were made.

Activity 3. Dental health services research

Description: Dental health services research in NZ, including ongoing, systematic dental workforce research.

Aims: Enhancement of the knowledge base for dental public health and clinical practice.

Source(s) of funding: Various – including NZDA Research Foundation, the Health Research Council of NZ, Dental Council of NZ.

Work in this area uses both quantitative and qualitative approaches, and continues to be diverse and productive.

Outcomes during 2007-2008: 13 papers were published and 4 conference presentations were made.

Activity 4. Development of new dental epidemiological and health services researchers and research capacity

Description: Training of new researchers for NZ and the Asia-Pacific region.

Aims: to build research capacity in our field.

Outcomes during 2007-2008: successful postgraduate completions comprised 1 Doctor of Philosophy (R Hashim), 1 Doctor of Clinical Dentistry (RJ Anning) and 1 Master of Community Dentistry (PV Sussex). Professor Thomson conducted a research development workshop on scientific writing at Universiti Malaya, Kuala Lumpur, Malaysia, on 6 May 2008. This event attracted 200 attendees from all over Malaysia.



Ely Rodrigues and research friend "Russell the Rat"

Education Research

Programme Leader: Professor Tom Kardos

Education Research is a new group within the Faculty that will be promoting the recognition of teaching as a professional activity, through research into dental education. A number of individuals have included research into education as part of their academic portfolios; however, until now there has not been a focused mechanism to encourage and enhance this significant activity in order to meet two of the University's strategic imperatives – achieving excellence in research-informed teaching and, ensuring outstanding campus environments and student experience. Research within this theme aims to contribute to knowledge and understanding and to improve the quality of undergraduate and postgraduate educational experiences in the Faculty.

The use of information communication technologies (ICT) as an educational resource for on-campus and distance-learning introduces a new range of skills for both staff and students. As with any innovations in teaching to enhance learning, the resources that are developed need to meet their educational objectives in addition to being targeted to the skills of the users. The new generation of learners, born since 1982, has been described as the “net generation” (Reynolds et al, 2008) as these students have grown up in a digital world. Potentially these students could be identified as eager adopters of the use of modern technologies to assist their learning. However, our recent research has shown that skills required for using digital resources made available to them, for research and learning, are poor; but, by contrast, social interaction skills

appear to be extremely well developed. In order to fully equip students for professional practice and research, relevant ICT courses might need to be embedded into already crowded undergraduate curricula.

Several projects investigating students' approaches to learning have been carried out by in the Faculty by Professor Jules Kieser in association with HEDC. Evaluations of inquiry-based programmes and resultant deep learning have led to new case scenarios being developed and context-rich problems being utilised in all undergraduate programmes. The recent appointment of Dr Vivienne Anderson has been a catalyst for research into students' study patterns and the admission processes facilitated through Associate Professor Alison Rich and programme leaders Mrs Alison Meldrum and Mr John Aarts. The CALT-funded research project led by Mrs Rosemary Kardos has focused on the use of e-Portfolios for reflective learning through the undergraduate curriculum, seamlessly integrating the professional development requirements with reflective undergraduate education. Outcomes from research into new initiatives (such as the transition process for 15 students from the International Medical University and evaluations of novel programmes in cariology) are eagerly anticipated.

Reynolds, P.A., Harper, J., Mason, R., Cox, M.J., & Eaton, K.A. (2008). An intricate web – Designing and authoring a web-based course. *British Dental Journal* 204, 519- 524.



Source: Coates, D.E., Kardos, T.B., Moffat, S. M. and Kardos, R. L. (2009) *Educational Perspective and Progression – Dental Therapists and Dental Hygienists for the New Zealand Environment.* *Journal of Dental Education* 73,1005-1012.

Oral Molecular and Immunopathology

Programme Leaders: Professor Greg Seymour and Associate Professor Alison Rich

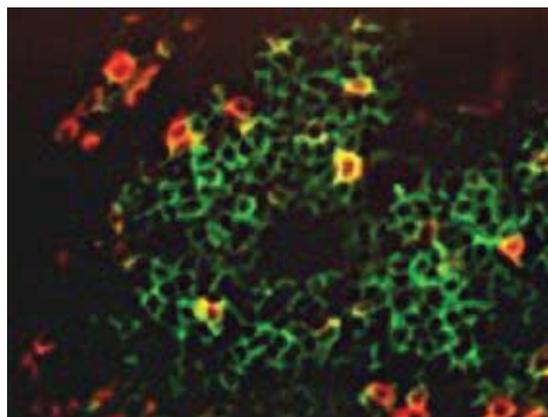
OVERVIEW

The main objective of our group is to explore the cellular and molecular basis of oral diseases, so as to improve their diagnosis and treatment. The group has three major themes: (i) periodontal diseases, (ii) oral mucosal disease including oral squamous cell carcinoma, and (iii) tissue regeneration. In this context, a range of molecular, immunological and pathological tools are employed including genomic and focused micro-arrays, real time PCR, and immunohistochemistry. In terms of periodontal disease the focus is on using the peripheral blood and salivary transcriptomes in the determination of susceptibility, the use of metagenomics to determine the oral microbiota and epigenetics to determine the influence of environmental factors such as smoking. The relationship with systemic diseases is being investigated as part of a multidiscipline international collaborative study, while the immunopathological mechanisms underpinning oral mucosal disease are being investigated using single and double layer immunofluorescence and immunohistochemistry. The role of periapical stem cells in terms of root development is also being investigated. In collaboration with the oral implantology research group, healing associated with dental implants is being studied in terms of gene expression and immunohistology.

STAFF AND STUDENTS

Praveen Babu	Kimmy Lin
Dawn Coates	Trudy Milne
Mary Cullinan	Anita Nolan
Shalin Desai	Erni Noor
Norman Firth	Lye Ng
Lara Friedlander	Ed Ohlrich
Nick Heng	Alison Rich
Hafez Hidayat	Nik Rosdy
Haizal Hussaini	Benedict Seo
Lynda Horne	Greg Seymour
Doris Lam	Suraya Sinon
Robert Love	

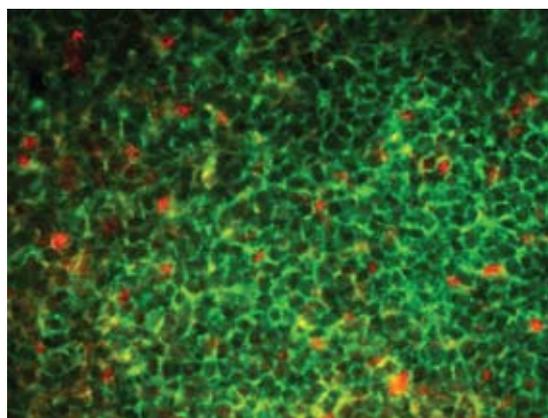
We are collaborating extensively with the oral implantology research group with studies investigating RANK/RANKL expression in healing of furcation defects in sheep and on Wnt gene expression during osseointegration in sheep.



Oral Molecular and Immunopathology

We have international collaborative studies with the Oral Cancer Research and Coordinating Centre, University of Malaya (www.malaysiaoralcancer.org) Malaysia, the School of Dentistry and School of Medicine of the University of Queensland, Australia, and the School of Dentistry, Niigata University, Japan.

In association with the School of Medicine University of Queensland, the group is conducting a major five year longitudinal clinical study on the relationship between periodontal and cardiovascular diseases. This study has attracted over \$3 million in funding over the past five years and as a result the group is considered a world leader in this field. The group is also recognized as a world leader in using molecular and cellular techniques in longitudinal clinical trials.



Double colour immunofluorescence staining of tonsil tissue for CD4+ (green) and FOXP3+ (red) regulatory T cell

SPECIFIC RESEARCH PROJECTS

Characterisation of natural regulatory T cells and Th17 cells in human periodontal disease.

Expression of pro-inflammatory cytokines and distribution of immune cells in oral squamous cell carcinoma.

Expression of toll-like receptor 2 in oral mucosal lichen planus using immunohistochemistry and quantitative real-time reverse transcriptase polymerase chain reaction

Endoplasmic reticulum stress in periodontal diseases

TLR2 & 4 in periapical lesions and Immunohistochemical localization of TLR2, TLR4, and the RANK/RANKL/OPG system in pulp and periradicular disease associated inflammatory root resorption.

Gene expression profiles of GroEL and heat shock protein 60 specific T cells in atherosclerosis and chronic periodontitis

The salivary and peripheral blood transcriptomes and susceptibility to progressive periodontal disease.

The role of bisphosphates on gingival fibroblast gene expression.

Periapical stem cells

PRIZES AND AWARDS

Greg Seymour was elected to Fellowship of the Royal Society of New Zealand in recognition of distinction in research and the advancement of science.



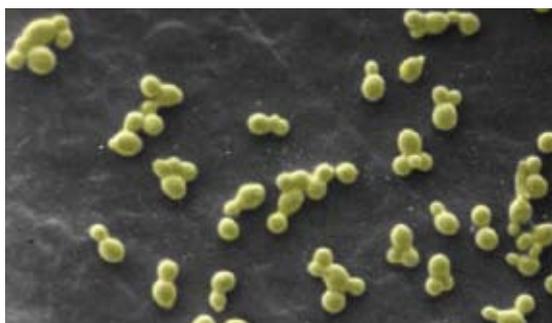
Joy Tahere studying the teeth of tuatara

Molecular Microbiology

Programme Leader: Professor Richard Cannon

Oral microbes cause discomfort, distress, or disease in a large proportion of the population. The research carried out under this programme aims to study the microorganisms responsible for a range of oral diseases, to understand how the diseases are caused, and to devise strategies to prevent them. There are several research themes within the Molecular Microbiology programme:

1. One project is investigating how periodontal bacteria acquire the haem they require for growth, as preventing this access may help prevent periodontal disease.
2. A group is investigating how bacteria colonize and invade dentinal tubules, which can lead to endodontic infections.
3. People possess unique oral microbial flora that are relatively stable. One research project is investigating whether criminals could be identified from unique patterns of bacterial DNA left on victims.
4. A research team is using second generation DNA sequencing technology to analyse the 'metagenome' associated with oral health and periodontal disease.
5. Proteins bearing the pathogenesis related domain (PRD) are involved in the immune response of plants, human reproduction, brain tumours and the production of marine toxins, but the molecular basis of their function is unknown. The Tex31 protein is being studied as a representative PRD protein to test the hypothesis that the PRD domain has a novel protease activity.
6. A major research focus is on the oral fungi that cause mucosal and systemic infections. One research team has discovered the major mechanism of clinically relevant drug resistance in oral fungi and is currently screening for drugs to overcome this resistance. The drug screening platform is also being applied to other, novel, antifungal drug targets and to drug targets implicated in other human diseases.

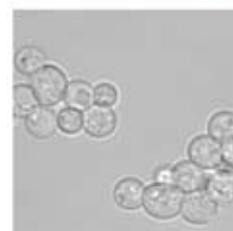
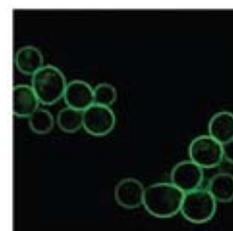


Candida Albicans yeast cells

7. Another research theme is microbial adhesion. One project is investigating the microorganisms that adhere to prostheses used as obturators for maxillary resections. Researchers have also identified saliva proteins that mediate adherence of *Candida albicans* to silicone and denture acrylic. A further project is investigating whether antibodies raised against this human pathogen can be used to prevent *C. albicans* adhesion.
8. *C. albicans* is often found in association with certain pre-cancerous oral lesions. A project is investigating whether production of the carcinogen acetaldehyde by *C. albicans* might contribute to the progression of an infected lesion to oral cancer.
9. *C. albicans* was thought until recently to be a diploid fungus that does not undergo sexual reproduction. A research group within the programme has discovered, however, that *C. albicans* strains can mate in an animal model of oral colonization. The group is testing whether the offspring can out-compete their parents.

In 2008, the Molecular Microbiology research team comprised two professors, three senior lecturers, three senior research fellows, four research fellows, two assistant research fellows a lab manager one master's student and five PhD students.

In 2007-2008, the Molecular Microbiology programme was awarded over \$2 million in research funding from the following sources: the Japan Health Sciences Foundation, the Japan Society for the Promotion of Science, the Health Research Council of New Zealand, the Foundation for Research Science and Technology, the Lottery Grants Board, the New Zealand Dental Research Foundation, Massey University Research Committee, Healthcare Otago Charitable Trust and the University of Otago Research Committee. The group also had ongoing funding from the National Institutes of Health (USA) and the Marsden Fund of the Royal Society.



Drug efflux pump Pdr5p labeled with green fluorescent protein is localized in the plasma membrane of *Saccharomyces Cerevisiae*

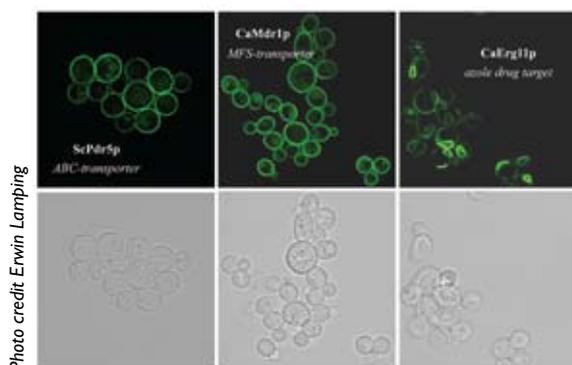
Oral Microbiology and Dental Health Research Theme

Theme Coordinator: Dr G.R.Tompkins

The mission of the University of Otago Oral Microbiology and Dental health Research Theme is to foster, support, and develop research into oral microbiology as it relates to dental health. The research theme will thus be a focus of scholarship and research in oral microbiology for the University of Otago, and for New Zealand.

The Theme comprises approximately 60 members including faculty, staff and students associated with the School of Dentistry, The Department of Microbiology and Immunology, and the Department of Pathology (Wellington). We also maintain links with approximately 20 researchers from around New Zealand, including commercial interests, with whom Theme members have developed collaborative projects. These extramural scientists often attend and contribute to Theme workshops. A main Theme activity is the hosting and sponsoring of leading researchers from around the world. We usually invite two overseas scientists to visit New Zealand each year:

Publications 59, Abstracts 58, Grants \$3.5 million



VISITING SCIENTISTS

Dr. Ann Griffen (Ohio State University), a paediatric dentist and an authority on the cariogenic capability of dental plaque presented “*Molecular analysis of bacteria in dental caries*” to the School of Dentistry and the Department Microbiology and Immunology (April 2007).

Dr. Gene Leys (Ohio State University), a molecular microbiologist, presented “*Molecular and population biology of periodontal pathogens*” to the School of Dentistry and the Department Microbiology and Immunology (April 2007).

Associate Professor Hiroji Chibana, (Chiba University, Chiba, Japan), gave an address at the Mini-symposium on Fungi which was part of the Joint New Zealand Microbiological Society – New Zealand Society for Biochemistry and Molecular Biology Conference in

Wellington (27-30 November 2007) entitled “*From molecules to complex systems*”.

Professor David Beighton, (King’s College, London), gave two major lectures at the 53rd Meeting of the New Zealand Microbiological Society: *Germs and Genomes in the Garden City*. (18 – 21 November 2008) and also research seminars in the Department of Microbiology and Immunology and the School of Dentistry (University of Otago).

WORKSHOPS

Workshops organised by and involving Theme members:

New Zealand Society for Biochemistry and Molecular Biology conference: *From molecules to complex systems* (Wellington, 27-30 November 2007).

A mini-symposium on Fungi was part of the Joint New Zealand Microbiological Society – New Zealand Society for Biochemistry and Molecular Biology 2007 Conference. Attended by Dr Jans Schimid of Massey University (Palmerston North) and Dr Justin O’Sullivan of Massey University (North Shore).

A qRT-PCR workshop and mini symposium was held at St Margaret’s College and included presentations from our Theme visitor, Professor David Beighton (Dental Institute, King’s College, London), and Dr Ivonne Petermann from Applied Biosystems (17 November 2008).

CONFERENCE SUPPORT

The Theme provided 16 grants-in-aid that allowed students and post-doctoral researchers to present their work at national and international conferences. The Theme also supported a session at the NZMS Conference.

EXTERNAL COLLABORATION

Ag Research, Ruakura
Department of Medical and Surgical Sciences,
University of Otago
Department of Pediatrics and Women’s Health,
University of Otago
Department of Microbiology, Massey University
Public Health Research Institute, Neward, NY, USA
Nippon Dental University, Niigata, Japan
National Institute of Health, Tokyo, Japan
BLIS Technologies, Dunedin. New Zealand
Environmental Science and Research, Kenepura,
New Zealand
Wellington Institute of Technology School of Pharmacy,
University of Otago

Faculty Research Profiles



VIVIENNE ANDERSON

PhD PGDipArts (Educ) BEd DipTchg
Dentistry
Dental Education Support Officer

During 2007 and 2008, Vivienne Anderson was engaged in full-time doctoral study in the University of Otago Faculty of Education and Department of Anthropology. Research outputs included a peer-reviewed journal article, a peer-reviewed international conference paper, and six other full conference papers (two international and four national). The peer-reviewed conference paper (presented at the ISANA International Education Association Conference 2008) received the IDP bursary for the best student paper.

Research and Collaboration

Vivienne's doctoral research project was an ethnographic study examining women's experiences in internationalised higher education and the links between these and higher education policy. Broader research interests include international and higher education policy and practice: how international education policy is worked out in practice in New Zealand, how critical theoretical perspectives can inform international education policy and practice, and how students' experiences and perspectives can inform teaching and student support practices in higher education.

Recent Publications

Anderson, V. (2008). The International Education Agenda: International and New Zealand women students. *A Journal of Social Anthropology & Cultural Studies* 3, 5 57-80.

Anderson, V. (2008). Re-imagining 'interaction' and 'integration': Reflections on a university social group for international and local women. The Gap, Queensland, Australia, 4061: ISANA International Education Association Inc. URL: <http://proceedings.com.au/isana2008/>

VINCENT BENNANI

DDS CertAdvPros CertAdvImpl Diplome de Docteur
d'Universite
Oral Rehabilitation
Senior Lecturer

Dr Bennani's research interests have focused on modern developments in implant dentistry, particularly the use of a new biocompatible ceramic material (Zirconia) for implant manufacture and implant framework superstructure fabrication. He is actively involved in several collaborative projects with other departments in the School of Dentistry investigating the microstructure of this new material in relation to its mechanical properties and exploring the possible applications in implant dentistry.

Research and Collaboration

Scope of Research:

Implantology
Biomechanics
Biomaterials
Prosthodontics

He is actively involved in several collaborative projects with other departments in the School of Dentistry, and outside the University.

Recent Publications

Bennani, V., Schwass, D., and Chandler, N.P. (2008). Gingival retraction techniques for implants versus teeth: current status. *Journal of the American Dental Association* 139, 1354-1363.





JONATHAN BROADBENT

BDS
Oral Sciences
Research Fellow

Jonathan Broadbent collects, analyses, and reports on data from the Dunedin Multidisciplinary Health and Development Study (a prospective observational study of a cohort of New Zealanders born in 1972-73).

His research efforts include projects involving the epidemiology of dental caries, tooth loss, and periodontal disease (with emphasis upon longitudinal research). His research has a focus on issues surrounding social and ethnic inequalities in oral health.

Research and Collaboration

The scope of his research during 2007-2008 has been broad, having published his work internationally in Public Health, Epidemiology, Psychiatry, Periodontology, Medical, and general dental journals. The research topics have ranged from inequalities in dental health between Māori and non-Māori, to research investigating the role of smoking cannabis in causing periodontal disease, to investigating the natural history of dental caries experience (and how this relates to social inequalities in dental caries experience).

This research has involved collaborations with researchers in Australia (Adelaide), Canada (Toronto), USA (Kansas City), the UK (London), and Brasil (Pelotas).

Recent Publications

Broadbent, J.M., Thomson, W.M., and Poulton, R. (2008). Trajectory patterns of dental caries experience in the permanent dentition to the fourth decade of life. *Journal of Dental Research* 87, 69-72.

Thomson, W.M., Poulton, R., Broadbent, J.M., Moffitt, T.E., Caspi, A., Beck, J.D., Welch, D., and Hancox, R.J. (2008). Cannabis smoking and periodontal disease among young adults: a lifecourse study. *Journal of the American Medical Association* 299, 525-531.

Ogders, C.L., Moffitt, T.E., Broadbent, J.M., Dickson, N., Hancox, R.J., Harrington, H., Poulton, R., Sears, M.R., Thomson, W.M., and Caspi, A. (2008). Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology* 20, 673-716.

Ogders, C.L., Caspi, A., Broadbent, J.M., Dickson, N., Hancox, R.J., Harrington, H., Poulton, R., Sears, M.R., Thomson, W.M., and Moffitt, T.E. (2007). Prediction of differential adult health burden by conduct problem subtypes in males. *Archives of General Psychiatry* 64, 476-484.

JOHN BROUGHTON

ED BSc BDS PhD PGDipComDent DipGrad
Oral Diagnostic and Surgical Sciences
Associate Professor

The focus of Associate Professor Broughton's research has been *oranga niho* (Māori oral health) and Māori and injury prevention. He is currently leading a research project in partnership with Raukura Hauora O Tainui, a leading Central North Island Māori health provider based in the Waikato. This project is "The impact of *oranga niho* on the quality of life of *rangatahi* who reside within the Waikato rohe of Tainui." The results are currently being analysed.

He is also part of the New Zealand Drivers Study in Injury Prevention.

Research and Collaboration

"The impact of *oranga niho* on the quality of life of *rangatahi* who reside within the Waikato rohe of Tainui." This project is funded by a grant from the Ministry of Health / New Zealand Dental Health Foundation and the Department of Preventive and Social Medicine PBRF funding. The research collaboration is with Raukura Hauora O Tainui, a major Māori health provider in the North Island. A pilot study was conducted in 2007 and the computer-based survey of 16 and 17-year-old *rangatahi* was conducted in 2008. The results of this study are currently being analysed.

"Reducing disease burden and health inequalities arising from chronic disease among Indigenous children: an early childhood intervention." He was invited to submit a full proposal in collaboration with Indigenous oral health researchers in Australia and Canada. He received a HRC grant to enable the consultation and proposal development to take place.

Recent Publications

Broughton, J.R. (2008). Waiora, the water of life. Viewpoint article on Māori and fluoridation. *New Zealand Dental Journal* 104, 144.

Cryer, C., Gulliver, P., Russell, D., Davie, G., Langley, J., and Broughton, J.R. (2007). A chartbook of the NZIPS serious injury outcome indicators for Māori; 1996-2005. New Zealand Injury Prevention Strategy Secretariat Accident Compensation Corporation, Wellington ISBN 0-908958-58-7

Broughton, J.R. (2007). Contributing author in "Ka Taoka Hakena, Treasures from the Hocken Collections." Ed. S. Strachan and L. Tyler. University of Otago Press, Dunedin ISBN 978 1 877372 40 7.





RICHARD CANNON

BA PhD

Oral Sciences

Professor and Head of Department

Professor Cannon is a molecular microbiologist interested in how microorganisms cause oral diseases and in how treatments for patients with these diseases can be improved. His research has a number of themes, one being oral adhesion. He is interested in how oral microbes, particularly yeast, adhere and colonize the oral cavity. He has found that saliva increases the adhesion of the yeast *Candida albicans* to several oral surfaces and he is investigating whether milk enriched in IgA antibodies can prevent this adhesion and hence preclude oral candidosis. *C. albicans* is a diploid yeast that was, until recently, thought to be asexual. The yeast can, however, undergo sexual recombination in vitro and he is currently investigating whether *C. albicans* strains can mate in the oral cavity, and if so, whether the offspring can out-compete their parents. A major focus of his research is the drug resistance of human fungal pathogens. His research has revealed that clinically significant fungal drug resistance is due to energy-dependent drug efflux from the cell. His research group has developed a unique system for expressing and studying these efflux pumps in baker's yeast *Saccharomyces cerevisiae*. They are currently using *S. cerevisiae* strains expressing fungal efflux pumps to study pump function and to search for pump inhibitors. He also has research interests in the potential role of *C. albicans* in promoting oral squamous cell carcinoma, the pathogenicity factors of *C. albicans* and in antifungal drug discovery.

Research and Collaboration

In a project funded by the NIH (USA), his research group has studied the *C. albicans* efflux pump Cdr1p which is responsible for the azole-resistance of clinical isolates. They have screened an in-house combinatorial D-peptide library, constructed by Dr Brian Monk in the Department of Oral Sciences and Associate Professor David Harding of Massey University, for Cdr1p inhibitors. They have optimized a potent peptide inhibitor and, in collaboration with Professor Shigeru Abe of Teikyo University Tokyo, they have shown that it makes an azole-resistant clinical *C. albicans* isolate susceptible to fluconazole in an animal model of oral candidosis. They are currently collaborating with Professor Larry Sklar at the University of New Mexico, USA, to develop a high-throughput assay to screen larger compound libraries for fungal pump inhibitors.

C. albicans biofilms can damage silicone voice prostheses and necessitate their frequent replacement. They have tested the ability of milk enriched in anti-*C. albicans* IgA antibodies to reduce the colonization of voice prostheses by *C. albicans* in laryngectomy patients. This study is being carried out in collaboration with A. Professor Patrick Dawes in the University of Otago Department of Medical and Surgical Sciences. In a Marsden-funded project in collaboration with Dr Jan Schmid of Massey University, they have shown that *C. albicans* can undergo sexual recombination in an animal model of oral colonization. They are now investigating the fitness of the offspring relative to that of their parents.

There is potential to use the novel *S. cerevisiae* protein expression system to study human membrane proteins involved in many common diseases. In a project funded by the Foundation for Research Science and Technology, and in collaboration with Associate Professor Susumu Kajiwara of Tokyo Institute of Technology, they are optimizing the system for the expression of human membrane proteins.

Recent Publications

Holmes, A.R., Lin, Y.-H., Niimi, K., Lamping, E., Keniya, M. V., Niimi, M., Tanabe, K., Monk, B.C., and Cannon, R.D. (2008). ABC transporter Cdr1p contributes more than Cdr2p to fluconazole efflux in fluconazole-resistant *Candida albicans* clinical isolates. *Antimicrobial Agents and Chemotherapy* 52, 3851-3862.

Cannon, R.D., Lamping, E., Holmes, A.R., Niimi, K., Tanabe, K., Niimi, M., and Monk, B.C. (2007). *Candida albicans* drug resistance - another way to cope with stress. *Microbiology* 153, 3211-3217.

Hodgkinson, A.J., Cannon, R.D., Holmes, A.R., Fischer, F.J., and Willix-Payne, D.J. (2007). Production from dairy cows of semi-industrial quantities of milk-protein concentrate (MPC) containing efficacious anti-*C. albicans* IgA antibodies. *Journal of Dairy Research* 74, 269-275.

Lamping, E., Monk, B.C., Niimi, K., Holmes, A.R., Tsao, S., Tanabe, K., Niimi, M., Uehara, Y., and Cannon, R.D. (2007). Characterization of three classes of membrane proteins involved in fungal azole resistance by functional hyper-expression in *Saccharomyces cerevisiae*. *Eukaryotic Cell* 6, 1150-1165.



NICHOLAS CHANDLER

BDS PhD MSc LDSRCS MRACDS FDSRCS FFDRCSI
Oral Rehabilitation
Associate Professor

Associate Professor Chandler has been interested in the diagnosis of dental pulp disease since MSc studies in 1983, with his works on Doppler ultrasound the only publications in English on the topic. He then moved to laser Doppler for his PhD studies. His thesis raised numerous areas for further research by Clinical Doctorate students at Otago. In the meantime, conventional (electric) pulp tests were the subject of a DClinDent thesis in 2007.

His aim to revisit Doppler ultrasound as a means of pulp diagnosis. He considers that, with purpose-made transducers and modern signals analysis equipment, the concept can be used clinically on a parallel to laser Doppler. This will result in a novel and practical diagnostic instrument.

Endodontic surgery has been a theme since 2002. Three DClinDent students are investigating infection at or near the root apex.

Research and Collaboration

King's College, University of London; the late Professor Tom Pitt Ford. Seven refereed publications and 7 abstracts. He is a chapter contributor to Harty's Endodontics in Clinical Practice (he was the former Editor) and will continue researching with colleagues in London.

University of Manchester; Dr Alison Qualtrough. Postgraduate Visiting Fellow at the Faculty of Dentistry twice. Four refereed papers and 4 abstracts have appeared, with an ongoing project, CRAP, underway. The Coronal Restorations Assessment Project aims to determine the relationships between the quality of coronal restorations and root canal fillings as seen on radiographs.

Recent Publications

Bogen, G., and Chandler, N.P. Vital pulp therapy (Chapter 35) In: Ingle's Endodontics 6th edn. 2008 (eds. Ingle J, Bakland L & Baumgartner J) pp. 1341-1360. BC Decker, Ontario, Canada.

Lin, J., and Chandler, N.P. (2008). Electric pulp testing- a review. *International Endodontic Journal* 41, 365-374.

Roy, R., Chandler, N.P., and Lin, J. (2008). Peripheral dentin thickness after root-end cavity preparation. *Oral Surgery, Oral Medicine, Oral Pathology, Radiology and Endodontics* 105, 263-266.

Lin, J., Chandler, N.P., Purton, D.G., and Monteith, B.D. (2007). Appropriate electrode placement site for electric pulp testing first molar teeth. *Journal of Endodontics* 33, 1296-1298.

DAWN ELIZABETH COATES (CLARK)

PhD
Oral Sciences
Research Fellow

Dr Coates (Clark) developed a platform of research for Bachelor of Oral Health staff at the Faculty of Dentistry. They successfully undertook workforce analysis research and gained funding to investigate whether both education and Motivational Interviewing alter the oral health practices of caregivers with young children.

Research and Collaboration

Dr Coates (Clark) established collaboration with the Auckland University of Technology Oral Health programme leaders. She also established an effective collaboration with a Clinical Psychologist which was essential for the Motivational Interviewing project.

Recent Publications

Lord, E.A., Martin, S.K., Gray, J.P., Li, C., and Clark, D.E. (2007). Cell cycle genes PEGF and CDKN1C in growing deer antlers. *Anatomical Record*. 290(8), 994-1004.

Li, C., Stanton, J.A., Robertson, T.M., Suttie, J.M., Sheard, P.W., Harris, A.J. and Clark, D.E. (2007) Nerve Growth Factor mRNA expression in the regenerating antler tip of red deer (*Cervus elephus*). *PLOS One*. 1, e148.

Li, C., Yang, F., Li, G., Gao, X., Xing, X., Wei, H., Deng, X., and Clark, D.E. (2007) Antler regeneration: A dependent process of stem tissue primed via interaction with its enveloping skin. *J. Experimental Zool.* 307A, 95-105.

Li, C., Mackintosh, C.G., Martin, S.K., and Clark, D.E. (2007) Identification of key tissue type for antler regeneration through pedicle periosteum deletion. *Cell Tissue Res* 328, 65-75.

US Patent 2007 Deer antler extract for promoting angiogenesis. No: 20070026084.





MARY CULLINAN

BDS MSc FADI

Oral Sciences

Associate Professor

Associate Professor Cullinan's research platform is based predominantly on clinical research in periodontology involving longitudinal studies looking at, on the one hand, the contribution of microbiological, genetic and environmental (particularly smoking) factors to risk for periodontal disease, and on the other, health promotion and the impact of oral disease on systemic health. More recent work has involved a metagenomic approach to unravel the complexities of the oral microbiota and the use of gene array technology to identify patient susceptibility to periodontal disease. Research and Collaboration

Research and Collaboration

Clinical research in 2007-2008 encompassed studies on the effectiveness of lasers in periodontal therapy in collaboration with Dr J Leichter; an evaluation of dental implant therapy in collaboration with Dr W Duncan, as well as the establishment of a clinical trial on implant therapy in conjunction with Associate Professor Alan Payne, Dr W Duncan and Associate Professor Rohana De Silva. International collaboration with Professor Malcolm West and Dr P Ford at The University of Queensland and Professor David Kavanagh at Queensland University of Technology continued with ongoing clinical studies on the relationship between oral and systemic health.

A metagenomic approach is being used to study the oral microbiota in health and disease across a wide age spectrum in collaboration with Drs Heng, Drummond, Stanton and Professor Seymour. Gene expression profiling is also being used in a variety of studies to further their understanding of periodontal disease susceptibility.

Collaboration with Professors N.P. Lang (University of Hong Kong) and M.J. Faddy (Queensland University of Technology) has resulted in ante-dependence modelling of a famous Norwegian data set to further their understanding of periodontal risk factors, with plans for modelling of an equally famous Sri Lankan data set.

Recent Publications

Cullinan, M.P., Westerman, B., Hamlet, S.M., Palmer, J.E., Faddy, M.J., Seymour, G.J., Middleton, P.G., and Taylor, J.J. (2008). Progression of periodontal disease and IL-10 gene polymorphism. *Journal of Periodontal Research* 43, 328-333.

Hamlet, S.M., Ganashan, N., Cullinan, M.P., Westerman, B., Palmer, J.E., and Seymour, G.J. (2008). A 5-year longitudinal study of *Tannerella forsythensis* prtH genotype: association with loss of attachment. *Journal of Periodontology* 79, 144-149.

Hamlet, S.M., Taiyeb-Ali, T.B., Cullinan, M.P., Westerman, B., Palmer, J.E., and Seymour, G.J. (2007). *Tannerella forsythensis* prtH genotype and association with periodontal status. *Journal of Periodontology* 78, 344-350.

Rautemaa, R., Lauhio, A., Cullinan, M.P., and Seymour, G.J. (2007). Oral infections and systemic disease – an emerging problem in medicine. *Clinical Microbiology and Infection* 13, 1041-1047.



HARSHA DE SILVA

*BDS MS FDSRCS FFDRCS
Oral Diagnostic and Surgical Sciences
Senior Lecturer*

Harsha De Silva joined the University of Otago on 1st April 2008.

He is in the process of trying to establish his research on oral cancer and pre-cancer to develop research collaboration with a tertiary hospital centre in Sri Lanka.

Research and Collaboration

Harsha contributed clinical support for ongoing research programmes in the faculty, providing oral surgical input.

ROHANA KUMARA DE SILVA

*BDS FDS RCPS FFD RCS FDS RCS
Oral Diagnostic and Surgical Sciences
Associate Professor*

The use of dental implants for replacing missing teeth is Associate Professor De Silva's main field of research. The aim of their study group is to investigate the use of dental implants as a cost-effective way of replacing missing teeth in a short period of time to improve the quality of life of edentulous patients. These treatment methods were applied to investigate the quality of life of the patients who use full and partial dentures. This area of research was accepted as an area of research strength by the University of Otago in September 2002.

He also conducts research into the management of post-operative pain after surgical removal of wisdom teeth and to evaluate metabolism of commonly used pain killers in the body. Several double-blinded crossover trials were conducted to compare the different analgesics commonly used in the management of post-operative pain after surgical removal of wisdom teeth.

Research and Collaboration

Associate Professor De Silva conducted a clinical trial to evaluate the safety and efficacy of two high-dose regimens of oral paracetamol in healthy adults undergoing third molar surgery under local anaesthesia. This was conducted in the SJWRI in collaboration with the department of Anaesthesia and School of Pharmacy.

He was the adviser and the main surgeon for a PhD student who investigated the use of a single dental implant to stabilize the lower denture.

He was the supervisor of a DClintDent student who conducted a research project to evaluate the ceramic single crowns on oral implants placed in extraction sockets.

Recent Publications

Zacharias, M., De Silva, R.K., Hickling, J., Medicott, N.J., and Reith, D.M. (2007). Comparative safety and efficacy of two high dose regimens of oral paracetamol in healthy adults undergoing third molar surgery under local anaesthesia. *Anaesthesia and Intensive Care* 35, 544-549.

Ong, J.C.J., De Silva, R.K., and Tong, D.C. (2007). Retrieval of a root fragment from the maxillary sinus – An application of the Caldwell-Luc procedure. (Case report) *New Zealand Dental Journal* 103, 14-16.

Hall, J.A.G., Payne, A.G.T., Purton, D.G., Torr, B., Duncan, W.J., and De Silva, R.K. (2007). Immediately restored, single tapered implants in the anterior maxilla. Prosthodontic and aesthetic outcomes after one year. *Clinical Implant Dentistry and Related Research* 9, 34-45.





BERNADETTE DRUMMOND

BDS MS PhD FRACDS

Oral Sciences

Associate Professor

Associate Professor Drummond's research has been concentrated on child oral health and treatment of dental diseases in childhood. This research has investigated the unique causes and factors related to oral diseases in children and has begun to look at the associations of oral disease in early childhood and general health. She has also investigated the long-term outcomes of dental treatment in terms of survival of materials used and technique success. It has also focused on the impact of dental care on the oral health-related quality of life in children. Data specifically recorded at every treatment carried out under general anaesthesia in the paediatric dental programme has formed the basis for her research and that of two graduate students. This outcome research is unique in New Zealand.

A related project was to run a commercial clinical trial aimed at establishing healthy bacteria in children's mouths.

Research and Collaboration

The main research projects in 2007 and 2008 related to the relationships of bone health and dental health, the provision of dental care for children under general anaesthesia (GA) throughout New Zealand, investigating molar-incisor hypomineralization (MIH) and determining the knowledge and understanding of parents in relation to their children's oral health care. This research has been conducted with students.

The relationships of bone health and dental health were investigated in collaboration with Dr A Goulding in the Department of Medicine. The New Zealand wide investigation of the use of GA for dental care involved collaboration with the Ministry of Health and the New Zealand Society of Hospital and Community Dentistry. Identification of the structural problems in MIH has led to a further project which is being developed to investigate one of the possible causes of this problem. The outcome of two surveys with parents – during pregnancy and with preschool aged children – has provided information that can be incorporated into oral health promotion to prevent early childhood caries.

Recent Publications

Farah, R.A., Drummond, B.K., Swain, M.V., and Williams, S.M. (2008). Relationship between laser fluorescence and enamel hypomineralisation. *Journal of Dentistry* 36, 915-921.

Lingard, G.L., Drummond, B.K., Esson, I.A., Marshall, D.W., and Wright, F.A.C. (2008). The provision of dental treatment for children under general anaesthesia. *New Zealand Dental Journal* 104, 10-18.

Miller, J.C., Grant, A.M., Drummond, B.K., Williams, S.M., Taylor, R.W., and Goulding, A. (2007). DXA measurements confirm parental perceptions of elevated adiposity in young children are poor. *Obesity* 15, 165-171.



WARWICK DUNCAN

ED BDS MDS PhD FRACDS (Perio)

Oral Sciences

Senior Lecturer

Dr Duncan's personal research involves novel techniques for improving dental implant treatment, using the sheep animal models that he has developed. Methods of analysis include histology, computerized tomography and micro-hardness testing. He has also performed surgery and supervised graduate student surgery for research projects involving (1) dental implants and (2) research into genetic factors controlling periodontal inflammatory responses in human subjects. He is also involved in research into the dental anatomy of *Sphenodon punctatus* (tuatara). His contributions to these projects included protocol development, applications for funding and ethical approval, histological analysis and editing the final published papers.

Research and Collaboration

International collaboration:

Professor Min-Ho Lee (Chonbuk University, Korea) in the animal testing of modified dental implants that he has developed.

Collaborations at Otago University:

Professor Mark Stringer (Anatomy & Structural Biology) – analysis of the human cavernous sinus.

Professor Gregory Seymour and other Periodontal staff (Oral Sciences) – genetic factors controlling periodontal inflammatory responses in human subjects, systematic audit of implants placed at the School of Dentistry, immediately-loaded dental implants in the sheep animal model.

Professor Jules Kieser (Oral Sciences) – characterization of the Tuatara dentary.

Professor Michael Swain (Oral Rehabilitation) – micro-computerised tomography for the analysis of osseointegrated titanium dental implants.

Associate Professor Alan Payne (Oral Rehabilitation) – immediate loading of titanium oral implants in human subjects.

Professor Robert Love and colleagues (Oral Diagnostic and Surgical Sciences) – effect of modified keratin proteins on osseointegration of dental implants in the sheep animal model.

Recent Publications

Duncan, W.J., Lee, M-H., Dovban, A.S.M., Hendra, N., Ershadi, S., and Rumende, H. (2008). Anodization increases early integration of Osstem implants in sheep femurs. *Annals of the Royal Australasian College of Dental Surgeons* 19, 152-156.

Duncan, W.J. (2008). Relationships between periodontal disease and systemic health in New Zealand: an overview of research at Otago University. In: *A Perspective of Periodontal Systemic Relationships for the Asian Pacific Region*, Bartold, P.M., Ishikawa, I., & Zhang, J, eds., Asian Pacific Society of Periodontology: Adelaide, p 12-18.

Hall, J.A.G., Payne, A.G.T., Puton, D.G., Torr, B., Duncan, W.J., and De Silva, R.K. (2007). Immediately restored, single-tapered implants in the anterior maxilla: prosthodontic and aesthetic outcomes after 1 year. *Clinical Implant Dentistry and Related Research* 9, 34-45.



JOHN EGAN

MHealSc PGDipCDTech
Oral Rehabilitation
Lecturer

Denturism can be defined as the fabrication and delivery of removable complete and partial dentures by non-dentists directly to the public. Known most commonly internationally as 'denturists', they are also known as clinical dental technicians (in the UK and New Zealand) and dental prosthetists (Australia). John Egan's research focuses on prosthodontic services and implant overdentures within the scope of practice of denturists.

Worldwide, denturism is very 'light' in peer-reviewed journals. Other areas of denturism include the worldwide education of denturists and population dental health in aging countries where denturists have a major impact. Further to his Masters Degree in 2006, he will continue with research into services and fees particularly on implant procedures. Curriculum changes, reducing removable prosthodontic teaching internationally, has 'opened the door' for an increase in denturism.

Research and Collaboration

John became a Lecturer in 2008. Published paper from 2006 Masters Degree together with supervisors Professor Murray Thomson and Associate Professor Alan Payne. Invited Speaker at two conferences and one branch meeting for Continuing Education.

Recent Publications

Egan, J.G., Payne, A.G.T., and Thomson, W.M. (2008). Removable prosthodontic services, including implant-supported overdentures, provided by dentists and denturists. *Journal of Oral Rehabilitation* 35, 252-258.

MAURO FARELLA

DDS SpecOrthodontics SpecMedStats Research Doctorate
Venia Legendi
Oral Sciences
Professor of Orthodontics

Professor Farella's research activities mainly focus on the physiology and pathology of the masticatory muscles and on their relationship to orthodontics, craniofacial growth, and temporomandibular disorders. He is currently also involved in a number of randomized controlled clinical trials in orthodontics and in clinical gnathology.

Listed below are the major topics of his research:

Neuromuscular and morphological features of subjects with different vertical craniofacial morphology.

Malocclusions, temporomandibular disorders, and body posture.

Investigations of factors affecting pressure tenderness of the jaw muscles.

Physiology of the masticatory muscles.

Efficacy of functional appliances in orthodontics.

Rapid versus slow palatal expansion: a multicenter randomized controlled trial.

Efficacy of conservative treatment for temporomandibular disorders.

Pain and weather: which relationship?

Motor unit overload as a possible cause of orofacial pain.

Research and Collaboration

Motor unit overload as a possible cause of orofacial pain. A special decomposition software (EMG-LODEC), developed at the University of Zurich, is currently being used to determine the occurrence of long-lasting activity (up to 30 minutes) of specific motor units in the human masseter muscle. Activity of the masticatory muscles is recorded by means of surface EMG matrixes and fine-wire intramuscular electrodes.

Collaboration: University of Zurich, Professor Sandro Palla and Professor Luigi Gallo

Rapid versus slow palatal expansion: a multicenter randomized controlled trial. The aim of this study is to compare the long-term and short-term efficacy of rapid palatal expansion (RPE) with that of a slow palatal expansion (SPE) in orthodontic patients affected with a transversal deficit of upper maxilla. A multicenter randomized clinical trial (RCT) is currently in progress.



Maxillary expansion is assessed by means of a conic beam computerized tomography (CBCT). The study is almost complete.

Collaboration: University of Naples Federico II. Professor Roberto Martina

Malocclusions, temporomandibular disorders, and body posture. The aim of this research project was to investigate the relationship between malocclusions, temporomandibular disorders and body posture by means of well-designed cross-sectional studies. The published results gave new guidelines to the orthodontists and other clinicians facing these arguments.

Collaboration: University of Naples Federico II. Professor Ambra Michelotti

Recent Publications

Farella, M., Michelotti, A., Iodice, G., Milani, S., and Martina, R. (2007). Unilateral posterior crossbite is not associated with TMJ clicking in young adolescents. *Journal of Dental Research* 86, 137-141.

NORMAN FIRTH

BDS MDSc FRACDS FFOP(R.C.P.A)
Oral Diagnostic and Surgical Sciences
Senior Lecturer

Norman Firth is a member of the Immunopathology Group of the Sir John Walsh Research Institute of the Faculty of Dentistry. Several grant applications have been successful for this group, including those he is involved with as co-supervisor. He is co-supervisor of a PhD student, two DCLinDent students and a conjoint MB ChB DCLinDent candidate.

Research and Collaboration

Norman is co-supervisor of projects related to oral pathology, oral cancer, odontogenic cysts and neoplasm and oral mucosal diseases.

Recent Publications

Rich, A.M., Firth, N.A., and Kardos, T.B. (2007). Review of oral pathology service, Medlab Dental, University of Otago 2002-2005. *New Zealand Dental Journal* 103, 34-36.





LYNDIE ANN FOSTER-PAGE

BSc BDS Dip Clin MComDent
Oral Rehabilitation
Senior Lecturer

As a new and emerging researcher Lyndie Foster-Page's main developing research themes are in dental public health, dental education and cariology. Her initial work has been around inequalities in oral health and health services research in Taranaki children and adolescents. Her first two publications formed the basis of this work and have allowed her to develop her major research theme around oral health-related quality of life in adolescents. Her early publication in this field has allowed ongoing collaboration with the University of Toronto and enabled her with their guidance to develop this research theme. She has submitted two papers from this research with her PhD supervisor (from her PhD) and submitted another as part of her collaboration with the Toronto team. She is also involved with a dental public health research team that secured an HRC grant for improving access for Taranaki rangatahi. She has also been involved with another team from the dental sector in Northland regarding fluoridating public water supplies and caries. They have just had two papers accepted for publication this year. As a new researcher she has formed a strong alliance with a group in the faculty researching dental education. She has been involved with a Masters student in analysing critical thinking and just secured a grant for quality improvement around the new cariology curriculum. She is collecting data around students' expectations of the school of dentistry. She is also working on her PhD.

Research and Collaboration

Dental Public Health especially health services research with Kate Morgaine and Professor Murray Thomson.
Northland District Health Board (pre and post fluoridation study).

Dental Education and Dr Vivienne Anderson

Oral health related quality of life and university of Toronto.

Dr Margherita Fontana and caries intervention collaboration University of Michigan.

Recent Publications

Foster Page, L.A. (2008). Vitamin-D-resistant rickets: report of a case. *New Zealand Dental Journal* 104, 111-114.

Foster Page, L.A., Thomson, W.M., Jokovic, A., and Locker, D. (2008). Epidemiological evaluation of short-form versions of the Child Perception Questionnaire. *European Journal Oral Sciences* 116, 538-544.

LARA FRIEDLANDER

BDS MDS FRACDS
Oral Rehabilitation
Senior Lecturer

Lara Friedlander completed her MDS in 1999, following which she has been a clinically practising endodontist and part-time professional practice fellow. In 2008 she began her first academic appointment as a Senior Lecturer. She has introduced a new area of research to the School of Dentistry involving dental stem cells which are at the forefront of dental research. Because this is new research, it has taken a while to plan, acquire appropriate resources and develop techniques. In 2008, she secured funding for the first study. She is enrolling for a PhD to take this research further. She also has a research interest in Dental Education and, in 2008, planning for the auditing of the 2009 endodontic curriculum was undertaken.

She co-supervises 3 DCLinDent (equivalent to PhD) student research projects in endodontic practice and immunopathology and am an active part of an immunopathology research group where she assists in advising on projects.

Research and Collaboration

Research in 2008 was primarily in planning stages for active research in 2009. This involved protocol preparation, gaining of ethical approval and funding, as well as developing techniques and links with other stem cell researchers, both within and outside dentistry.





CATHARINA HAUMAN

BChD MMedSci MDS
Oral Rehabilitation
Senior Lecturer

The scope of Catharina Hauman's research involves the microbiology and disinfection of root canal dentine relevant to conventional root canal treatment and apical surgery by using dead/live staining and confocal microscopy. She also investigates new instrumentation devices for removing infected but not affected carious dentine.

Research and Collaboration

Studies with Dr Geoffrey Tompkins, Jonathan Leichter, Associate Professor Nick Chandler, together with the Otago Electron and Confocal Microscope Unit, are investigating the efficacy of dentine disinfection, including laser application, by determining the viability of bacteria in dentine using fluorescence methods. Studies with Dusan Kuzmanovic are looking at the ability of an existing polymer rotary instrument, "Smartprep", to cut healthy dentine. This research aims to contribute to help develop instruments for improved selective caries removal.

Recent Publications

Hauman, C.H., Kuzmanovic, D. (2007). An evaluation of polymer rotary instruments to remove healthy dentine. *European Journal of Prosthodontics and Restorative Dentistry* 15, 77-80.

Parmar, D., Tompkins, G., Hauman, C.H.J., Leichter, J.W. (2007) Fluorescence viability determination of bacteria in dentine. Presented at the 13th Biennial Congress of the European Society of Endodontology (Istanbul).

LIHONG HE

BDS MDS DDS PhD
Oral Rehabilitation
Senior Lecturer

PhD on Biomaterials in Faculty of Dentistry, The University of Sydney

Research and Collaboration

PhD on Biomaterials in Faculty of Dentistry, The University of Sydney

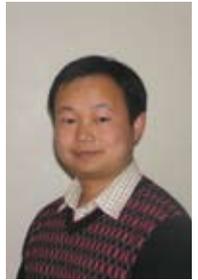
Recent Publications

He, L.H., and Swain, M.V. (2008). Understanding the mechanical behaviour of human enamel from its structural and compositional characteristics. *J Mech Behavior Biomed Mater* 1, 18-29.

He, L.H., Standard, O.C., Huang, T.T.Y., Latella, B.A., and Swain, M.V. (2008). Mechanical Behaviour of Porous Hydroxyapatite. *Acta Biomaterialia* 4, 577-586.

He, L.H., and Swain, M.V. (2008). Nanoindentation creep behavior of human enamel. *J Biomed Mater Res*, DOI, 10.1002/jbm.a.32223.

Schneider, G.A., He, L.H., and Swain, M.V. (2008). Viscous flow model of creep in enamel. *Journal of Applied Physics* 103, 014701.



NICHOLAS C K HENG

BSc PhD
Oral Sciences
Senior Lecturer

Dr Heng's primary research expertise is in molecular microbiology, genetics and molecular biology. Up until 2007, much of his research output has been the genetic basis of antimicrobial proteins (bacteriocins) produced by oral bacteria. More recently, as a new academic in the University of Otago Faculty of Dentistry, he has initiated his own research programmes centred around the application of next-generation DNA sequencing technology to biological systems, with emphasis on the use of the Roche Genome Sequencer FLX (GS-FLX) System. Next-generation sequencing is cutting-edge technology that has only been available in New Zealand since mid-2007 and is rapidly gaining popularity. In addition to his own research interests, he also assists with the supervision of postgraduate (Doctor of Clinical Dentistry [DClinDent]) candidates, mainly from the disciplines of periodontics and paediatric dentistry.

Research and Collaboration

Dr Heng has two ongoing areas of research at the present time:

Microbial (bacterial) diversity of the human oral cavity in health and disease (periodontal disease and dental caries) using the GS-FLX high-throughput sequencing system.

Sequencing the genomes of two strains of the oral bacterium *Streptococcus salivarius*, one of the predominant species in the oral cavity. They wish to reveal the genetic secrets that allow *S. salivarius* to be such a successful oral coloniser.

Within the Faculty of Dentistry, he currently has ongoing collaborations with Professor G.J. Seymour and Associate Professor M.P. Cullinan (Discipline of Periodontics) and Associate Professor B.K. Drummond (Discipline of Paediatric Dentistry) in relation to the microbial diversity projects. In addition, he has collaborations with Professors J.R. Tagg and G.W. Tannock (Department of Microbiology & Immunology, Otago School of Medical Sciences) in the fields of antimicrobial proteins and gastrointestinal microbiology, respectively. One of the aims of the genome sequencing projects is to uncover novel antimicrobial proteins produced by *S. salivarius* which could be useful in the development of new oral probiotic preparations.

Recent Publications

Heng, N.C.K., Burtenshaw, G.A., Jack, R.W., and Tagg, J.R. (2007). Ubericin A, a class IIa bacteriocin produced by *Streptococcus uberis*. *Applied and Environmental Microbiology* 73, 7763-7766.

Swe, P.M., Heng, N.C.K., Ting, Y.T., Baird, H.J., Carne, A., Tauch, A., Tagg, J.R., and Jack, R.W. (2007). *ef1097* and *ypkK* encode enterococcin V583 and corynicin JK, members of a new family of antimicrobial proteins (bacteriocins) with modular structure from Gram-positive bacteria. *Microbiology (UK)* 153, 3218-3227.

Heng, N.C.K., Wescombe, P.A., Burton, J.P., Jack, R.W., and Tagg, J.R. (2007). The diversity of bacteriocins produced by Gram-positive bacteria, In M.A. Riley and M.A. Chavan (eds.), *Bacteriocins – ecology and evolution*, Springer, Heidelberg, Germany, pp. 45-92.

Heng, N.C.K., Tagg, J.R., and Tompkins, G.R. (2007). Competence-dependent bacteriocin production by *Streptococcus gordonii*. *Journal of Bacteriology* 189, 1468-1472.



DOUGLAS W HOLBOROW

BDS FDSRCS
Oral Sciences
Senior Lecturer

Douglas Holborow's principal research field is clinical dentistry. His focus has been on answering questions arising out of the clinical practice of dentistry. Questions that provide suitable projects for student-based research have been the main focus in the two-year period of this review.

Research and Collaboration

His research in DCLinDent projects as a supervisor or co-supervisor has involved:

Periodontal microbiology

Influence of heme availability on the viability of *Porphyromonas gingivalis* and *Prevotella intermedia*, following exposure to reactive oxygen species.

The salivary transcriptome as a biomarker for identifying susceptibility to periodontitis.

Implant dentistry

Comparison of immediately and delayed-loaded tapered roughened surface implants (3i Osseotite, Brånemark TiUnite) in the posterior mandible in a sheep model.

Periodontal Immunology

Gene-array comparison of the effect of gingivitis and periodontitis upon peripheral lymphocytes.

Recent Publications

Wong, B.K.J., Leichter, J.W., Chandler, N.P., Cullinan, M.P., and Holborow, D.W. (2007). Radiographic Study of Ethnic Variation in Alveolar Bone Height Among New Zealand Dental Students. *Journal of Periodontology* 78, 1070-1074.

ANN HOLMES

BSc PhD
Oral Sciences
Senior Research Fellow

Dr Holmes' research field is the molecular biology of oral microbes, in particular the oral commensal fungus, *Candida albicans*, which can cause mucosal and systemic infections of humans. Between 2007 and 2008, she has co-authored 5 articles (in a career-to-date total of 51 papers in peer-reviewed journals) and was co-author on 9 presentations to national and international scientific conferences or meetings, including 2 as first author and presenter. During this period, she had significant (co-investigator) involvement in 3 successful research grants, including NZ\$1,377,097 (2004-2009) from the National Institutes of Health, USA, awarded to Professor Richard D Cannon as PI. Grants were awarded for research into: (i) the involvement of yeast plasma membrane efflux pumps in resistance to antifungal drugs; (ii) membrane protein structure and function; (iii) *C. albicans* biofilms on voice prostheses. She is co-supervisor of 6 PhD students (due for completions between 2009 and 2011).

Research and Collaboration

The involvement of yeast plasma membrane efflux pumps in resistance to antifungal drugs; and (ii) membrane protein structure and function:

Collaborators: Professor Richard D Cannon, Dr Brian C Monk, Dr Erwin Lamping, Dr Kyoko Niimi, Dr Masakazu Niimi, Dr Mikhail Keniya (University of Otago), Professor Larry Sklar (University of New Mexico, USA), Dr Susumu Kajiwara, (Tokyo Institute of Technology).

C. albicans biofilms on voice prostheses:

Collaborators: Professor Richard D Cannon, Mr Karl Lyons, Associate Professor Patrick Dawes (University of Otago); Dr Ali Hodgkinson, Dr Liz Carpenter, Dr Brendan Haigh, Dr Tom Wheeler (AgResearch Ruakura); Professor Colin Bingle (University of Sheffield, UK)

Cloning and expression of the *C. albicans* ADH genes and role of *C. albicans* acetaldehyde production in oral cancer progression:

Collaborators: Professor Richard D Cannon, Associate Professor Alison Rich, (University of Otago) Ms Marina Bakri (University of Malaya)



Recent Publications

Holmes, A.R., Lin Y-H., Niimi, K., Lamping, E., Keniya, M.V., Niimi, M., Tanabe, K., Monk, B.C., and Cannon, R.D. (2008). ABC transporter Cdr1p contributes more than Cdr2p to fluconazole efflux in fluconazole-resistant *Candida albicans* clinical isolates. *Journal of Antimicrobial Chemotherapy* 52, 3851-3862.

Cannon, R.D., Lamping, E., Holmes, A.R., Niimi, K., Tanabe, K., Niimi, M., and Monk, B.C. (2007). *Candida albicans* drug resistance another way to cope with stress. *Microbiology* 153, 3211-3217.

Maki, K., Holmes, A.R., Watabe, E., Iguchi, Y., Matsumoto, S., Ikeda, F., Tawara, S., and Mutoh, S. (2007). Direct comparison of the pharmacodynamics of four antifungal drugs in a mouse model of disseminated candidiasis using microbiological assays of serum drug concentrations. *Microbiology Immunology* 51, 1053-1059.

Hodgkinson, A.J., Cannon, R.D., Holmes, A.R., Fischer, F.J., and Willix-Payne, D.J. (2007). Production from dairy cows of semi-industrial quantities of milk-protein concentrate (MPC) containing efficacious anti-*C.albicans* IgA antibodies. *J Dairy Research* 74, 269-275.

TOM KARDOS

MDS PhD FFOP (RCPA)

Oral Sciences

Professor of Oral Biology

The Sir John Walsh Research Institute (SJWRI) is the focal point for oral health research in New Zealand. It includes research into education as one of its themes. While there has been rapid development of new technologies and educational techniques over the last thirty years, dental educators appear to have been slow to take advantage of these new developments. By contrast information, communication technologies (ICT) have been widely adopted by practising dental professionals. One of the challenges for the Faculty is to develop curricula that not only prepare graduates for life-long learning but also provide them with an understanding of scientific and social concepts and cultural relationships as they apply to professional practice and research in New Zealand.

The introduction of new Bachelor of Dental Surgery and Bachelor of Oral Health degrees has presented unique opportunities to conduct qualitative and quantitative research, in collaboration with the HEDC, into the effectiveness of novel as well as commonly used teaching modalities in the Faculty, in addition to the development and evaluation of ICT-based programmes to augment learning. Evaluations of ICT literacy and the introduction of e-Portfolios into the Bachelor of Oral Health programme, to enhance reflective learning practice, have been completed. A longer-term outcome will be the establishment of an active education research group/unit in the Faculty.

Research and Collaboration

The use of Information Communications Technologies (ICT) in teaching and learning is an integral part of academic life at the University of Otago. All staff and students have access to the University's information technology services, electronic learning resources and an institutional learning management system (LMS) BlackBoard®. Further, a recent partnership with Apple® Computer through iTunesU provides storage space and a sophisticated framework for managing and delivering content provided by the University's staff or students for learning, administration or entertainment. A key to appropriate utilization of these resources is computer literacy. Internationally, there is an expectation that " a graduate dentist must be able to use ICT for the benefit of personal and professional development," however, Professor Kardos' research has shown that, although students are competent in social networking, they lack the skills for effective use of ICT in learning and research.



Further, with the potential for the adoption and use of ICT for distance learning and continuing professional development initiatives by the University, significant advances towards meeting the University's strategic imperatives would be enhanced by collaborations within the Faculty, HEDC and ITS.

Recent Publications

Nash, D.R., Friedman, J.W., Kardos, T.B., Kardos, R.L., Schwarz, E., Satur, J., Berg, D.G., Nasruddin, J., Mumghamba, E.G., Davenport, E.S., and Nagel, R. (2008). Dental therapists: A global perspective. *International Dental Journal* 58, 61-70.

Rich, A.M., Firth, N.A., and Kardos, T.B. (2007). Review of Oral Pathology Service Medlab Dental, University of Otago, 2002-2005. *New Zealand Dental Journal* 103, 34-36.

MIKHAIL KENIYA

MSc PhD

Oral Sciences

Research Fellow

Dr Keniya's main scientific interest is investigating mechanisms of microbial resistance to extreme environments.

The research field in which he is working is the structural biology of membrane transporters, enzymology, molecular genetics and compound library screening.

He became a Research Fellow in 2008, and since then, he has co-authored 2 articles in peer reviewed journals. Since 2007, he participated in 5 national and international conference presentations, being the first author in 3 of them.

Since 2007, he has had significant (co-investigator) involvement in a successful research grant application (Fungal transporters: from resistance to new antifungals) from the National Institutes of Health, USA. The value of this grant (2004-2009) awarded to Professor Richard D Cannon as PI was \$1,377,097.

Research and Collaboration

In 2007-2008, his research focus was in molecular biological and proteomics aspects of functional heterologous expression of the *Candida albicans* plasma membrane H⁺ATPase in *Saccharomyces cerevisiae*. The other research area was in screening small molecule libraries for broad spectrum inhibitors of fungal ABC-type drug transporters.

He has had a significant role in maintaining the group's collaboration with Professor David Perlin, the director of Public Health Research Institute (PHRI) in Newark, New Jersey, USA. As a former employee, He keeps in close contact with Dr Perlin and members of his laboratory. In 2007, he visited the PHRI in order to foster the collaboration with Professor Perlin as part of the NIH grant "Fungal transporters: from resistance to new antifungals".

Recent Publications

Holmes, A.R., Lin, Y.H., Niimi, K., Lamping, E., Keniya, M.V., Niimi, M., Tanabe, K., Monk, B.C., and Cannon, R.D. (2008). ABC transporter Cdr1p contributes more than Cdr2p to fluconazole efflux in fluconazole resistant *Candida albicans* clinical isolates. *Antimicrobial Agents and Chemotherapy* 52, 3851-3862.





JULES KIESER

BSc BDS PhD DSc FLS FDSRCS FFSSoc
Sir John Walsh Research Institute
Director

Success in today's highly competitive research environment can be achieved only through collaboration across a broad spectrum of activities. Professor Kieser's research platform rests on three different, yet interrelated areas; firstly, craniofacial biomechanics; secondly, forensic biology; and finally, education research.

Dentistry is unique: it has a bimodal interest in the dentition on the one hand, and the cranial structures that support it on the other. Craniofacial biomechanics addresses one of the unresolved mysteries of this region; how are form and function interrelated? His research delves into this question by looking into the biomechanics of swallowing, mastication and tooth wear, both in humans and also in that New Zealand icon, the tuatara *Sphenodon punctatus*.

The classic view of CSI forensics is completely out of touch with reality. Part of his work on forensic biology is to stimulate broad-scale research on this topic, and he has established a vibrant research group who are looking at marine decomposition, bacterial fingerprinting, body fluid analysis, cranial bloodspatter and traumatology.

The link between research and teaching is well established in the modern academic environment. His research focuses on students' understanding of professional practice. He is specifically interested in Heideggerian embeddedness and student learning.

Research and Collaboration

Professor Kieser's craniofacial research collaborations are mainly channeled through members of the Biomouth Group (Otago, Auckland and Massey Universities), Chris Bolter of the Physiology Department and Dr Maggie-Lee Huckabee at the Van Der Veer Institute of Canterbury University. Other collaborations include the tuatara research project with Nicola Nelson (Victoria University) and Christopher Dean and Marc Jones (University College London).

Forensic research collaboration is mainly through the Forensic branch of ESR (Michael Taylor, Stephen Cordiner and Jacqui Horswell), and also with Vale Bernal of the Argentinian National Museum, Michael Tsokos of the Charite Hospital, Berlin and Helen Liversidge of the London Hospital. Locally his forensic research collaborators are Associate Professor Russell Poulter, Professor Keith Gordon, Professor Mike Eccles, Dr Geoff

Tompkins, Dr Jo Stanton, Dr Debra Carr, Professor Mark Stringer and Dr Keith Probert.

In the field of education research, he collaborates with Associate Professor Tony Harland (HEDC) and Dr Gloria Dall'Alba (University of Queensland).

Recent Publications

Kieser, J.A., DeFeiter, J. and TeMoananui, R. (2008).

Automated dental aging for child victims of disasters. *American Journal of Disaster Medicine* 3, 109-112.

Kieser, J.A., Bernal, V., Gonzalez, P., Birch, W., Thurmaine, M., and Ichim, I. (2008). Analysis of experimental cranial skin wounding. *International Journal of Legal Medicine* 122, 179-187.

Te Moananui, R., Kieser, J.A., Herbison, P., and Liversidge, H. (2008). Advanced dental maturation in New Zealand Māori and Pacific Island children. *American Journal of Human Biology* 20, 3-50.

Ichim, I., Swain, M., Kieser, J.A. (2007). Functional significance of strain distribution in the human mandible during mastication. *Archives of Oral Biology* 52, 465-473.

ERWIN LAMPING

Dipl Ing PhD
Oral Sciences
Senior Research Fellow

Dr Lamping studies the drug resistance mechanisms of opportunistic fungal pathogens (i.e. different *Candida* species, *Cryptococcus neoformans* and *Aspergillus fumigatus*) with an emphasis on the main fungal drug targets, Erg11p (azoles) and Fks1p (echinocandins), and on multidrug efflux pumps – all integral membrane proteins that are notoriously difficult to investigate. Most of his studies are undertaken using one of the best-studied and genetically tractable eukaryotic model organisms, *Saccharomyces cerevisiae*, as a host. He created a panel of fungal Erg11p and multidrug efflux pump expressing yeast strains that has been used successfully by their research team and their overseas collaborators to discover novel fluorescent efflux pump substrates as well as potent efflux pump inhibitors that can overcome multidrug resistance of clinical isolates.

In the period between 2007 and 2008 he has co-authored 4 research articles (1 as first author). He has co-authored 15 poster/oral presentations, 3 of which he presented himself. He helped create and maintain important international collaborations with leading research groups from Japan and the USA that have led to a number of joint publications, 1 patent that is currently being prepared, and a number of successful grant applications (NIH, USA; JHSF, Japan; and NZ-FRST, New Zealand). Strains and plasmids from his research has been disseminated to 47 research groups in 14 different countries (covered under a MTA between the University of Otago and individual research organizations).

Research and Collaboration

In the previous two years, Dr Lamping's research was focused on the optimization of expression of human membrane proteins in their patented host and eukaryotic model organism *Saccharomyces cerevisiae*. This project is funded by the New Zealand Foundation for Research Science and Technology and includes an active collaboration with Associate Professor Susumu Kajiwara, Tokyo Institute of Technology, Yokohama, Japan, who regularly visits their laboratory.

Other activities included the study of the structure and function of fungal membrane proteins, in particular efflux pumps that cause multidrug resistance of fungal pathogens such as *Candida albicans*, a major opportunistic human fungal pathogen. As part of this ongoing research, valuable collaboration with Dr K Tanabe at the National

Institute of Infectious Diseases, Tokyo, Japan, resulted in a joint publication of the discovery of two novel antifungal compounds, unnarmicins A and C, that are multidrug efflux pump inhibitors of the major *Candida albicans* efflux pump Cdr1p. As expected and hoped for, unnarmicins A and C are able to overcome multidrug resistance of clinically resistant *C. albicans* strains.

Other valuable and active collaborations include: a collaboration with Professor R Stroud, Dept of Biochemistry and Biophysics, USCF, USA, on the expression, purification and structural analysis of eukaryotic membrane proteins; a collaboration with Professor L Sklar, Univ. of New Mexico, USA, that has led to the discovery of a novel fluorescent multidrug efflux pump substrate, Nile Red, published in 2009, as well as the discovery of a yet to be disclosed novel multidrug efflux pump inhibitor that is currently being patented.

In 2008, he initiated a collaboration with Professor Pete Magee, Univ. of Minnesota, MN, USA, on the genomic organization and karyotyping of *C. krusei*, another opportunistic fungal pathogen, that will result in joint publication(s) in 2010.

Recent Publications

Holmes, A.R., Lin, Y-H., Niimi, K., Lamping, E., Keniya, M. V., Niimi, M., Tanabe, K., Monk, B. C., and Cannon, R.D. (2008). ABC transporter Cdr1p contributes more than Cdr2p does to fluconazole efflux in fluconazole-resistant *Candida albicans* clinical isolates. *Antimicrob Agents Chemother* 52, 3851-3862.

Lamping, E., Monk, B.C., Niimi, K., Holmes, A.R., Tsao, S., Tanabe, K., Niimi, M., Uehara, Y., and Cannon, R.D. (2007). Characterization of three classes of membrane proteins involved in fungal azole resistance by functional hyperexpression in *Saccharomyces cerevisiae*. *Eukaryot Cell* 6, 1150-1165.

Cannon, R.D., Lamping, E., Holmes, A.R., Niimi, K., Tanabe, K., Niimi, M., and Monk, B.C. (2007). *Candida albicans* drug resistance another way to cope with stress. *Microbiology* 153, 3211-3217.

Tanabe, K., Lamping, E., Adachi, K., Takano, Y., Kawabata, K., Shizuri, Y., Niimi, M., and Uehara, Y. (2007). Inhibition of fungal ABC transporters by unnarmicin A and unnarmicin C, novel cyclic peptides from marine bacterium. *Biochem Biophys Res Commun* 364, 990-995.



JONATHAN W LEICHTER

BA DMD Cert Perio
Oral Sciences
Senior Lecturer

The scope of Dr Leichter's research demonstrates his commitment to multi-disciplinary collaboration. He has conducted research and has had publications in high-ranking dental journals in the disciplines of periodontology, cariology, dental trauma, endodontics and dental materials. Since 2006, he has obtained 6 research grants totaling over \$59,000, negotiated major equipment donations of over \$60,000 and has facilitated student research stipends each year. He has been a supervisor for 10 postgraduate student research theses and 8 undergraduate research projects. These collaborations have resulted in 6 international peer-reviewed publications and 17 peer-reviewed conference proceedings. On invitation, he has presented his research in New Zealand, Australia and Japan.

Research and Collaboration

Much of his research during this period has been focused on laser applications in dentistry. He has conducted research on quantifying autofluorescence-controlled Er:YAG laser removal of carious dentine, and laser disinfection of infected root canals, and was involved in several projects evaluating root-end cavity disinfection with Er:YSSG lasers. A major focus of his research was on laser applications in periodontology. Their research compared fluorescence-guided Er:YAG laser debridement and mechanical therapy for the nonsurgical treatment of chronic periodontitis validated lasers as the only monotherapy for periodontitis that is comparable to the gold standard of scaling and root planing.

Recent Publications

Wong, B., Leichter, J.W., Chandler, N.P., Cullinan, M., and Holborow, D. (2007). Radiographic study of ethnic variation in alveolar bone height among New Zealand dental students. *J Perio* 78, (6) 1070-1074.

Chandler N.P., Leichter J.W., Oginni A.O. and Jennings, M. (2007). Dens invaginatus - a rare case in a maxillary third molar. *ENDO-Endodontic Practice* 1, 279-282.

ROBERT LOVE

BDS MDS PhD FRACDS
Oral Diagnostic and Surgical Sciences
Professor and Head of Department

Professor Love's prime area of research is the mechanisms involved in dentine colonisation and infection, with an emphasis on molecular aspects of bacterial interactions with substances. The published work is the only one to show that bacterial infection of dentine follows all the principles of colonization; an important concept to determine, as understanding will lead onto prevention. The quality of this work has been recognised in the way of being invited to write review articles in this field as well as forming the basis of a book chapter in endodontic microbiology. They are now relating the microbial infection aspect of dentine/endodontic infection to disease progression/pathology with the histopathological and immunological profile of refractory periapical lesions, forming the basis of extension into this field.

Research and Collaboration

Immunohistopathological aspects of bacterial related periapical lesions is being conducted as part of the Immunopathology group of the SJWRI.

Epidemiology of endodontic disease is being conducted as part of the Epidemiology Group of the SJWRI.

PhD student research into ceramic restorations is being conducted as part of the Biomaterials group of the SJWRI.

PhD student research into microbial infection of maxillofacial prosthesis is being conducted as part of the Molecular oral microbiology group of the SJWRI.

Bacterial invasion of dentine is being conducted with Professor H. Jenkinson, University of Bristol, UK.

Recent Publications

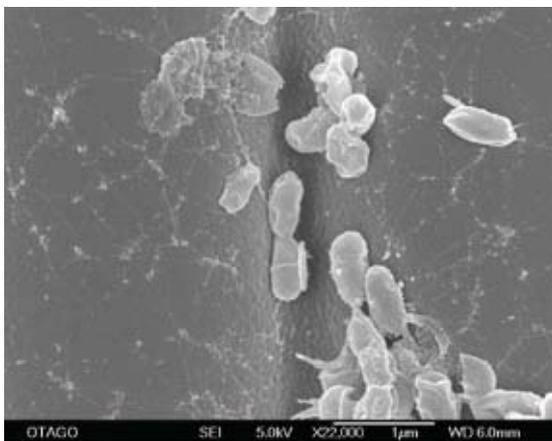
Love, R.M. and Ponnambalam, Y. (2008). Dental and maxillofacial skeletal injuries seen at the University of Otago School of Dentistry 2000-2004. *Dental Traumatology* 24, 170-176.

Hobson, R., Rolland, S., Rotgans, J., Schoonheim-Klein, M., Best, H., Chomyszyn-Gajewska, M., Dymock, D., Essop, R., Hupp, J., Kundzina, R., Love, R., Memon, R. M., Moola, M., Neumann, L., Ozden, N., Roth, K., Samwel, P., Villavicencio, J., Wright, P. and Harzer, W. (2008). Quality assurance, benchmarking, assessment and mutual international recognition of qualifications. *European Journal of Dental Education* 12, 92-100.



Love R.M. (2007). Hemin nutritional stress inhibits bacterial invasion of radicular dentine by two endodontic anaerobes. *International Endodontic Journal* 40, 94-99.

Kirk D.G., Liston, P.N., Tong, D.C., and Love, R.M. (2007). Influence of two different flap designs on incidence of pain, swelling, trismus, and alveolar osteitis in the week following third molar surgery. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 104, e1-e6.



A SEM of bacterial colonisation

KARL LYONS

BDS MDS Cert.MaxillofacialPros FRACDS
Oral Rehabilitation
Senior Lecturer

Karl Lyons has been enrolled in a PhD (part-time) investigating microbial adhesion to obturator prostheses. These prostheses are used to dentally restore surgical resection defects in the maxilla of patients who have had surgery to remove cancer in the palate or sinuses. He has been carrying out the clinical and laboratory parts of this study, collecting data, but he has not yet submitted any manuscripts for publication. He has presented two posters and three oral presentations based on work from this study.

Research and Collaboration

Karl has been carrying out the materials and methods part of his PhD study, as well as working with doctoral and masters students.

Recent Publications

Mackie, A., and Lyons, K.M. (2008). Temporomandibular disorders and occlusion. *New Zealand Dental Journal* 104, 54-59.

Minguez, C.L., and Lyons, K.M. (2007). Failure of crowns and bridges. *New Zealand Dental Journal* 103, 7-13.





EITHNE MACFADYEN

BDS FDSRCPS

Oral Diagnostic and Surgical Sciences

Senior Lecturer

Eithne MacFadyen has been involved in developing two research projects related to Special Needs Dentistry as part of the requirements for the DClinDent course. These studies are now underway.

Research and Collaboration

The first of the above studies relates to developing an outline for the establishment of a Special Needs Dentistry service for Malaysia, based on the New Zealand experience. This work is being carried out with support and input from the Ministry of Health in Malaysia and with one of their staff as the field investigator.

The second study will focus on the oral health status of elderly individuals admitted to Dunedin Hospital for medical assessment. They wish to establish whether the widely reported poor oral status of rest home residents is already evident at this time or develops subsequently. This work is being carried out in collaboration with Professor John Campbell and the staff of the Care of the Elderly service, Otago District Health Board.

ALISON MELDRUM

MDS

Oral Sciences

Senior Lecturer



Alison Meldrum's research focuses on student learning and the acquisition of knowledge. This involves the investigating changes in curriculum delivery and its effects on learning outcomes. Other research interests have included exploring the effect on childhood caries following the completion, by caregivers, in a motivational interviewing programme, and the clinical application of milk products against oral infections.

Research and Collaboration

AgResearch/University of Otago Collaborative Research Fund. Inhibition of colonisation of *Streptococcus mutans* by milk products

Designed and completed a pilot clinical trial to investigate the inhibitory effect of chewing gum containing milk products.

Contribution assisted in the conception and design of a rat model clinical trial to develop experimental caries and subsequently to investigate the prevention of caries using hyperimmune products. Analysis and dental assessment of sectioned rat jaws.

New Zealand Dental Foundation Grant. "Improving the oral health of preschoolers" –developing a workable and effective tool for the oral health professional."

This research will design a brief intervention methodology for use in the NZ School Dental Service with the caregivers of young children. It is a pilot scale randomised controlled trial comparing the effectiveness of 'motivational interviewing' and 'current intervention' of caregivers on oral health behaviours of School Dental Service children aged 6-24 months.

Co-researchers Dr D Coates and Dr A Hannah



TRUDY MILNE

PhD NZCS
Oral Sciences
Assistant Research Fellow

Dr Milne's early work in the Dental School focused on gene expression during orthodontic tooth movement. She has continued this interest in gene expression, but with the goal of furthering understanding in the area of immunopathogenesis of periodontal disease and the relationship between periodontal and systemic diseases.

Research and Collaboration

Research projects which she is involved with include "GroEL and heat shock protein 60 specific T cells in atherosclerosis and chronic periodontitis", "The effect of smoking on periodontal ligament fibroblasts and gingival fibroblasts", "Gene expression of peripheral blood lymphocytes in gingivitis and periodontitis: a comparison using PCR array", and "Angiogenesis regulation in bisphosphonate-treated gingival fibroblasts: a study of gene expression".

She is collaborating with the School of Dentistry at The University of Queensland, Australia on their Oral Inflammation and Atherosclerosis Research Programme. They are developing a multiplex qRT-PCR assay for the quantitation dental pathogens.

She has an ongoing collaboration with Dr Joel Tyndal (School of Pharmacy, University of Otago), Dr Brian Monk (Oral Sciences, University of Otago), and Dr Richard Lewis (Institute of Molecular Biosciences, The University of Queensland, Brisbane, Australia) to determine the structure of Tex31, the protease characterised during her PhD.

Recent Publications

Pinkerton, M.N., Wescott, D.C., Gaffey, B.J., Beggs, K.T., Milne, T.J., and Meikle, M.C. (2008). Cultured human periodontal ligament cells constitutively express multiple osteotropic cytokines and growth factors, several of which are responsive to mechanical deformation. *Journal of Periodontal Research* 43, 343-351.

Milne, T.J. (2008). Purification and characterisation of Tex31, a conotoxin precursor processing protease, isolated from the venom duct of *Conus textile*. PhD Thesis, Queensland University of Technology, Queensland, Australia.

Wescott, D.C., Pinkerton, M.N., Gaffey, B.J., Beggs, K.T., Milne, T.J., and Meikle, M.C. (2007). Osteogenic gene expression by human periodontal ligament cells under cyclic tension. *Journal of Dental Research* 86, 1212-1216.

SUSAN MOFFAT

BA DPH CertDentTherp
Oral Sciences
Lecturer



Susan Moffat's PhD research centres on the establishment of the New Zealand School Dental Service (SDS). Although the SDS has been described as 'unique', and has been often praised for its success, very little has been written about this Service and its dental nurses. Existing histories discuss the Service in terms of its success, or from the point of view of the dentists who ran the Service. This research will make an important contribution to the research on the SDS, and will emphasise the contribution of the early dental nurses and their views on the establishment of the Service.

Other research projects include research on dental therapy and oral health education, dental therapy workforce research and dental public health.

Research and Collaboration

University of Otago 'Targeted Research Development Programme' funding has enabled collaboration with other staff members within the Bachelor of Oral Health (BOH) Programme for research on education (dental therapy and the implementation of the BOH programme), workforce (dental therapy and BOH graduates) and dental public health (preschool oral health).

In collaboration with colleagues, she has obtained 2 grants. One of these is an external grant (NZDA/MOH administered Oral Health Research Fund) and has funded BOH workforce research. The other grant is a University of Otago Research Grant (UORG) for a research project that looks at the acceptability of primary health care nurses giving oral health advice to the parents of preschool children and enrolling children with the School Dental Service

Recent Publications

Samotoi, A., Moffat, S.M., and Thomson, W.M. (2008). Musculoskeletal symptoms in New Zealand dental therapists: prevalence and associated disability. *New Zealand Dental Journal* 104, 49-53.

Moffat, S.M., and Falconer, M. (2007) Pioneer Dental Nurse. *Journal of the New Zealand Dental Therapists' Association*. 14, 12-15.

Samotoi, A., Moffat, S.M., and Thomson W.M. (2007). Musculoskeletal symptoms in New Zealand Dental Therapists – 12 month prevalence and associations. *Journal of the New Zealand Dental Therapists' Association* 14, 4-5.



BRIAN C. MONK

BSc Hons PhD
Oral Sciences
Senior Lecturer

Dr Monk's goal is to discover new ways to combat infectious disease, especially where drug resistance is important. Combinatorial chemistry has been used to obtain unique peptide-based surface-targeting compound libraries. Molecular genetic manipulation of yeast and bacterial systems is used to express drug targets for effective screening of compound libraries. Bioinformatic screening has identified a group of structurally resolved antifungal drug targets that will facilitate the selection of broad-spectrum antifungals. Most of the antifungal targets of interest are membrane proteins. They include essential P-type ATPases, fungal glucan synthase, cytochrome P450 enzymes and drug efflux pumps. Other targets include soluble enzymes e.g. fungal topoisomerase and archaeobacterial DNA gyrases and bacterial sortases. The challenge of obtaining monodisperse membrane proteins for structural resolution by X-ray crystallography is well advanced, with some targets of interest in crystal trials. The yeast expression system patented in 2003 is used widely to express membrane proteins from a range of sources including pathogenic fungi, plants and humans. Related research interests include defining mechanisms of echinocandin (a new antifungal class), herbicide and antimalarial resistance, expressing human drug targets for drug screening, and equipping yeast biofactories with efflux pumps to improve productivity by protecting against toxic substrates, products and metabolites.

Advanced screens (e.g. integrated bioinformatic, structure-directed, cell-based and protein target-based) are applied to anti-infective discovery – an area the pharmaceutical industry neglects. Specific inhibitors of drug efflux pumps have been obtained and multifunctional azoles (single compounds that hit three targets) that prevent multidrug efflux in pathogenic yeast are a goal. Other goals include the creation of efficient yeast biofactories, the use of structure-directed and screen-based discovery to overcome resistance to frontline (artemisinin) antimalarials, the identification of broad spectrum fungicides using essential, structurally resolved antifungal targets, and the facilitation of drug discovery by crystallizing membrane protein and soluble antimicrobial targets. Other research applies proteomics to tooth development and enamel strength, uses heterologous expression to analyze the structure and function of the CAP family of proteins, aims to define the requirements for heterologous expression in yeast of human ABCG2 (a

marker of breast cancer refractory to chemotherapy), and measures anti-infective-surface interactions.

Research and Collaboration

Dr Monk leads multiple projects in the Molecular Microbiology Laboratory (MML) headed by Professor Richard D. Cannon. This includes collaboration and/or supervision of a team of 4 senior post-doctoral fellows (Dr Ann Holmes, Dr Erwin Lamping, Dr Kyoko Niimi, Dr Mikhail Keniya) studying antifungal drug targets, drug efflux mechanism responsible for antifungal resistance and heterologous expression of membrane proteins, supported by NIH (USA) and FRST IIOF funding. Collaboration with Professor Andre Goffeau (Universite Catholique de Louvain) since 1998 has focused on yeast membrane protein expression and antifungal chemosensitizer discovery. In 2008-2009 collaboration with Professor Goffeau and Dr Philip Baret (Universite Catholique de Louvain) included the phylogenetic analysis of the PDR family of efflux pumps in the model yeast *S. cerevisiae* and pathogenic fungi. The NIH-funded project (2006-09) has involved collaboration with Professor DS Perlin (Public Health Research Institute, Newark, NJ, USA) and Professor Abe, (Teikyo University, Tokyo, Japan) for animal trials, Professor DRK Harding (Center for Separation Science, Massey University) for the development/delivery of synthetic peptides that evolved from use of peptide combinatorial libraries, and with Dr E. Fleischer (MicroCombiChem, Weisbaden, Germany) for chemical compounds, libraries and peptide derivatives. Collaboration with Professor Richard D. Cannon, Dr Kyoko Niimi, Astellas Pharma and the National Institute for Infectious Diseases in Japan (Dr Masakazu Niimi) since 2006 has determined the molecular basis of echinocandin resistance in *C. albicans* and *C. glabrata*. Multiple research contracts have been completed. In 2008-2009 the Portuguese Foundation for Science and Technology supported his collaboration with Professor Isabel Sa Correia, Instituto Superior Tecnico (IST), Lisbon on the expression of plant efflux pumps in *S. cerevisiae* and on antimalarial discovery. Professor Sa Correia is one of Portugal's leading researchers using yeast to express plant genes.

Since 2007, he has collaborated with Trudy Milne (MML) and Joel Tyndall (National School of Pharmacy, University of Otago) on the structure and function of recombinant members of the family of CAP proteins. In 2008 he began collaboration with Associate Professors Phil Bremer (Food Science) and Jim McQuillan (Chemistry) on the interaction of cells, proteins and peptides with metal surfaces of relevance to medicine and dentistry. He

works with cariologist Associate Professor Bernadette Drummond, materials scientist Professor Mike Swain and PhD student (now post-doctoral researcher) Rami Farah in proteomic analysis of tooth development and enamel strength in health and disease. This multidisciplinary research has led to the hypothesis that trauma may deleteriously affect enamel development.

Recent Publications

Monk, B.C. and Goffeau, A. (2008). Outwitting multidrug resistance to antifungals. *Science* 321, 367-369.

Holmes, A.R., Lin, Y.H., Niimi, K., Lamping, E., Keniya, M., Niimi, M., Monk, B.C., and Cannon, R.D. (2008). ABC transporter Cdr1p contributes more than Cdr2p to fluconazole efflux in fluconazole-resistant *Candida albicans* clinical isolates. *Antimicrobial Agents and Chemotherapy*, 52, 3851-3862.

Lamping E., Monk B.C., Niimi K., Holmes A.R., Tsao S., Tanabe K., Niimi M., Uehara Y., and Cannon R.D. (2007). Characterization of three classes of membrane protein involved in fungal azole resistance by functional hyperexpression in *Saccharomyces cerevisiae*. *Eukaryotic Cell* 6, 1150-1165.

Cannon, R.D., Lamping, E., Holmes, A.R., Niimi, K., Tanabe, K., Niimi, M., and Monk, B.C. (2007). *Candida albicans* drug resistance another way to cope with stress. *Microbiology* 153, 3211-3217.

KATE MORGAINE

BA MPH DipTchg
Oral Sciences
Lecturer

"An ounce of prevention is better than a pound of cure"
Benjamin Franklin.

While we all might agree with the statement, understanding just how we might prevent disease and injury is another matter. There are several aspects to prevention that range from taking personal responsibility and changing behaviour; through changing the social and physical contexts people live, work and play in, to changing policies and societal norms.

Kate Morgaine's research interests centre on assessing the need for, and evaluating the effectiveness of, a range of health promotion/education interventions to improve health, and in particular oral health, at a population rather than an individual level.

Research and Collaboration

Current research includes undertaking a programme evaluation to determine the effectiveness of an occupational safety intervention, assessing the utilisation of and barriers to free basic oral health care by rangatahi (young Māori people), and testing the feasibility of a community level intervention to improve the oral health of people with cardiovascular disease.

Collaboration is with other researchers with similar interests as well as with the communities involved. Collaborators include: Alison Meldrum, Mary Cullinan, Lyndie Foster Page and Murray Thomson within the Dental Faculty; John Broughton, Ngai Tahu Health Research Centre and the Injury Prevention Research Unit's Occupational Health and Safety research team within Otago University; Susan Cartwright, Blanche Farmer, and Sharmyn Turner from Auckland University of Technology; and members of the Taranaki District Health Board's Māori health, oral health, and health promotion teams.

Recent Publications

Morgaine K.C., and Moore A.J. (2007) "Ethics: What matters in health promotion" & "What matters: External Challenges to ethical practice in health promotion". *Health Promotion Forum: Keeping Up to Date Volume 25 & 26*, Auckland.



KYOKO NIIMI

DVM PhD

Oral Sciences

Senior Research Fellow

Dr Niimi's research interests are in microbiology/mycology research and the development of antifungal agents, with three main areas of research expertise: the molecular biology of human fungal pathogens *Candida albicans* and *C. glabrata*, the mechanisms of antifungal resistance and drug development, and heterologous protein expression in yeast *Saccharomyces cerevisiae*. During 2007-2008, her major research outputs included: (1) co-authorship of four published articles in reviewed international journals, (2) principal or co-author on 17 presentations at international and national conferences, and (3) contributing to 3 successful grant applications from NZ, USA and Japan and to a research contract with Astellas Pharma Inc. (Japan). In her career to date, she has published 40 articles, with an H-factor of 13, which have been cited more than 400 times in total. She works in collaboration with research team members in the Department of Oral Sciences, University of Otago and Massey University (Palmerston North), and with other researchers in 17 overseas universities or Institutes (in Japan and Belgium) and in companies (Astellas Pharma Inc., Japan and Pfizer, USA). She is currently co-supervisor of 1 PhD student (due for completion 2012).

Research and Collaboration

Dr Niimi's research scope in 2007 and 2008 was twofold:

(1) Investigating mechanisms of echinocandin resistance in human fungal pathogen *Candida glabrata* (Astellas- and UORG-funded research project). A novel class of antifungal agent, the echinocandins, provides new therapeutic options for the treatment of fungal infections caused by *C. glabrata*, the second most frequently isolated *Candida* species. Although *C. glabrata* is highly susceptible to echinocandins, there are some reports of echinocandin resistant isolates from patients with treatment failure. They found that mutations in two separate genes are required for the acquisition of high level echinocandin resistance, which may be why clinically significant echinocandin resistance in *C. glabrata* is rare. A manuscript describing this finding is in preparation for publication. Key collaborators in this project include Drs K. Maki and K. Hatakenaka of Astellas Pharma Inc., Japan (undertook *in vitro* enzyme assays to establish glucan synthase inhibition profiles); Dr H. Nakayama, Suzuka National College of Technology (provided protocols for genetic engineering of *C. glabrata*, plasmid DNA and auxotrophic strains) and

Associate Professor H. Chibana, Chiba University, Japan (created mutant strains).

(2) Modifying the heterologous membrane expression system to maximise protein expression (IIOF-funded research project). The heterologous membrane expression system in baker's yeast was developed in the Molecular Microbiology Laboratory (MML). However, the system needs to be further improved to achieve high level expression of human membrane proteins such as Abc1p, Abc2p or Abc5p that are involved in drug resistance in human cancer cells. The main focus of her research has been to introduce the tetracycline (tet)-regulatable system into the host yeast strain ADDelta. Strains expressing human *ABC1* or *C. albicans* CDR1 under tet-regulation were created, and are currently being characterised. Key collaborators include Professor Richard D Cannon, Drs Brian C Monk, Masakazu Niimi and Erwin Lamping of MML and Assoc Prof. S. Kajiwara, Tokyo Institute of Technology, Japan.

Recent Publications

Tanabe, K., Niimi, K., and Niimi, M. (2008). What's new in the molecular basis of antifungal drug resistance in pathogenic yeasts. *Nippon Rinsho (Japanese Journal of Clinical Medicine)*, 66, 2273-2278.

Holmes, A.R., Lin, Y.H., Niimi, K., Lamping, E., Keniya, M, Niimi, M., Monk, B.C., and Cannon, R.D. (2008). ABC transporter Cdr1p contributes more than Cdr2p to fluconazole efflux in fluconazole-resistant *Candida albicans* clinical isolates. *Antimicrobial Agents and Chemotherapy*, 52, 3851-3862.

Cannon, R.D., Lamping, E., Holmes, A.R., Niimi, K., Tanabe, K., Niimi, M., and Monk, B.C. (2007). *Candida albicans* drug resistance another way to cope with stress. *Microbiology* 153, 3211-3217.

Lamping, E., Monk, B.C., Niimi, K., R Holmes, A.R., Tsao, S., Tanabe, K., Niimi, M., Uehara Y., and Cannon, R.D. (2007). Characterization of three classes of membrane proteins involved in fungal azole resistance by functional hyper-expression in *Saccharomyces cerevisiae*. *Eukaryotic Cells* 6, 1150-1165.



ALAN GT PAYNE

BDS MDent DDSc FCD
Oral Rehabilitation
Associate Professor

Associate Professor Payne's evidence-based treatment approach of different loading protocols using multiple oral implant systems for implant dentures has achieved international recognition in dentistry. He conducts randomized control trials and laboratory-based research on the surgical, prosthodontic and restorative aspects of both implant dentures and single-tooth implant crowns to restore oral function of young and older adults following partial or complete tooth loss. He has an ability to attract full-time national and international graduate students into these higher level qualifications, as a result of his international reputation. His current contingent consists of 4 full-time PhD international students and 1 part-time national PhD student. His supervision of Masters and clinical doctorate (DClinDent) students shows a record of successful and on-track completions.

Research and Collaboration

Associate Professor Payne's oral implantology research group conducts clinical and laboratory-based research relating to implant overdentures and single-implant crowns in improving the oral-health-related quality of life of both old and young adults. Their evidence-based treatment approach of reducing the delay between oral implant placement and loading with the prosthesis is internationally recognized in dentistry. They have extensive collaborations as listed below:

Professor M. MacEntee, Associate Professor Joanne Walton, University of British Columbia, Canada

Professor J. Feine, McGill University, Montreal, Canada

Professor R. Mericske-Stern, University of Berne, Switzerland

Professor P. Owen, Dr Y. Solomons, University of Witwatersrand, South Africa

Professor J. Wennström, University of Göteborg, Sweden

Associate Professor T. Walton, University of Sydney, Australia

Dr D. Wismeijer, ACTA, University of Amsterdam, Netherlands

Dr M. Esposito, Cochrane Collaboration, University of Manchester, United Kingdom

Recent Publications

Aarts, J. M., Payne, A.G.T., and Thomson, W.M. (2008). Patients' evaluation of two occlusal schemes for implant overdentures. *Clinical Implant Dentistry and Related Research* 10, 140-156.

Egan, J. G., Payne, A.G.T., and Thomson, W.M. (2008). Removable prosthodontic services, including implant-supported overdentures, provided by dentists and denturists. *Journal of Oral Rehabilitation* 35, 252-258.

Hall, J.A.G., Payne, A.G.T., Purton, D.G., Torr, B., and Duncan, W.J. (2007). Immediately restored, single tapered implants in the anterior maxilla: Prosthodontic and aesthetic outcomes after one year. *Clinical Implant Dentistry and Related Research* 9, 34-45.

Waddell, J.N., Ichim, I., Payne, A.G.T. and Swain, M.V. (2007). Fatigue failures of bar attachments solder joints for implant-supported overdentures. *Journal of Fracture Mechanics* 74, 1148-1159.

NINA PLANITZ

Dip DTech Dipl Ing (FH)
Oral Rehabilitation
Lecturer

Nina Planitz's main focus is in the field of biomaterials, specifically on fracture mechanics of denture base materials for implant superstructures. In order to determine the limits of denture base material in terms of dimensional design, the anticipated methodology involves triangular beams being produced with an average volume of an acrylic denture. The clinical relevance of this research is their application as a superstructure, which means that beams including implant matrices of different sizes will determine implant abutment dimensions. So far, the results have showed that, even though the diameter of the abutment reduces strength, it still withstands enough force to tolerate the masticatory forces.

She is also participating in other research groups, which are focusing on hardness of different materials.

Recent Publications

Planitz, N. (2008). How to choose your denture base material. *New Zealand Institute of Dental Technologists Annual Conference*.

DAVID PURTON

MDS FRACDS
Oral Rehabilitation
Senior Lecturer

Research on dental implants investigates ways to replace teeth lost to disease and trauma. Ceramic crowns on implants is the state of the art for replacing single missing teeth. Millions are done worldwide each year. Research is testing simplified protocols that could save money, reduce treatment times and reduce the number of surgical procedures patients have to undergo.

Research on a novel instrument to assess pulp proximity has the potential to prevent pulpal injury and the need for root canal treatments. Modern electronics make this possible. Data not previously available in the English language literature have been published about this instrument.

Many clinical decisions are based on the outcome of electrical pulp testing. Research has investigated the testing of molar pulp sensibility as previously the best way to do this had not been described in the literature.

Research and Collaboration

Collaboration has been established between disciplines in the Department of Oral Rehabilitation, between Departments in the School of Dentistry, and between the University of Otago and the University of Manchester.

Recent Publications

Lin, J., Chandler, N.P., Purton, D.G., and Monteith, B.D. (2007). Appropriate electrode placement site for electric pulp testing first molar teeth. *Journal of Endodontics* 33, 1296-1298.

Hall, J.A.G., Payne, A.G.T., Purton, D.G., Torr, B., Duncan, W.J., and De Silva, R.K. (2007). Immediately restored, single tapered implants in the anterior maxilla. Prosthodontic and aesthetic outcomes after one year. *Clinical Implant Dentistry and Related Research* 9, 34-45.



ANDREW QUICK

BSc MChD MOrthRCSEd MRACDS
Oral Sciences
Senior Lecturer

The properties of nickel titanium orthodontic wires and their application in orthodontic space closure has been investigated *in vitro*. The data obtained has allowed a clinical trial to be completed, comparing the rate of space closure using the NiTi loops and standard TMA wire loops.

Enamel demineralisation is an ongoing problem in orthodontics, and a pilot study has elucidated techniques for analysing and quantifying demineralisation changes consequent to different types of therapy. A novel patented device (through Otago Innovation Limited), that enhances compliance with home-based therapy, is being investigated in a clinical trial.

Mandibular motion studies have not been conducted in orthodontic patients undergoing treatment with growth modification appliances. The changes that take place are being investigated in a clinical trial using a 12-camera digital recording system, in collaboration with the School of Physiotherapy.

Research and Collaboration

Dr G. Johnson, School of Physiotherapy, University of Otago, Dunedin, New Zealand.

Professors J. Kieser, Oral Sciences, and M.V. Swain, Oral Rehabilitation, Faculty of Dentistry, University of Otago, Dunedin, New Zealand.

Associate Professor P. Herbison, Preventive and Social Medicine, School of Medicine, University of Otago, Dunedin, New Zealand.

Recent Publications

Lim, Y., Quick, A.N., Swain, M.V., and Herbison, P. (2008). Temperature Effects on the Forces, Moments and Moment to Force Ratio of Nickel-Titanium and TMA Symmetrical T-loops. *Angle Orthodontist* 78, 1035-1042.

Ross, A.P., Gaffey, B.J., and Quick, A.N. (2007). Breakages using a unilateral fixed functional appliance: a case report using the Forsus Fatigue Resistant Device. *Journal of Orthodontics* 34, 2-5.

ALISON RICH

BDS MDSc PhD FRACDS FFOP (RCPA)
Dentistry
Associate Dean

Associate Professor Rich is a co-leader of the Oral Molecular and Immunopathology Group in the Sir John Walsh Research Institute. The main aim of this group is to investigate the pathogenesis of various oral diseases in an attempt to provide more accurate diagnostic and prognostic information and potential therapeutic advances. This group has been successful in attracting a number of grants for their work, and she intend to continue to use her skills as a diagnostic oral pathologist and experienced research supervisor to advance the group. Over 2007-2008, she was co-supervisor of 4 PhD and 4 DClinDent students, as well as assisting with the supervision of other postgraduate and undergraduate student research projects.

Another aspect of her research relates to her role as Associate Dean- Undergraduate Studies. She has a Research into University Teaching Grant to determine whether the performance of dental students in selection tasks correlates with subsequent academic and clinical performance. She is part of a team investigating dental workforce issues in New Zealand, and this group has published widely.

Research and Collaboration

Investigation of various aspects of potentially malignant oral disorders and oral squamous cell carcinoma is an ongoing project and, during 2007-2008, the main area of interest was characterising the nature and role of inflammatory cells in the connective tissue adjacent to islands of invading keratinocytes. Specifically, the type and distribution of tumour-infiltrating lymphocytes and cells expressing toll-like receptor 2 was assessed and their influence on the tumour microenvironment was analysed.

This work was enhanced by collaboration with the Oral Cancer Research and Coordinating Centre, University of Malaya (www.malaysiaoncology.org) whose Director, Professor Rosnah Zain, visited the Faculty of Dentistry in 2008.

Recent Publications

Ayers, K.M.S., Thomson, W.M., Al-Hassiny, H., Rich, A.M., and Newton, J.T. (2008). A qualitative investigation of the experiences of immigrant dentists working in New Zealand. *New Zealand Dental Journal* 104, 97-103.



Ayers, K.M.S., Thomson, W.M., Newton, J.T., and Rich, A.M. (2008). Job stressors of New Zealand dentists and their coping strategies. *Occupational Medicine* 58, 275-281.

Tong, D.C., Leaper, M.R., Colquhoun, A. N., and Rich, A.M. (2008). An unusual presentation of oropharyngeal mucosal plasmacytosis related to toothpaste. *Journal of Laryngology and Otology* 122, 1112-1115.

Rich, A.M., Firth, N.A., and Kardos, T.K. (2007). Review of oral pathology service, Medlab Dental, University of Otago 2002-2005. *New Zealand Dental Journal* 103, 34-36.

GREGORY SEYMOUR AM FRSNZ

BDS MDSc PhD FRCPath FFOP (RCPA) FRACDS (Perio) FICD FADI

Dentistry
Dean

Professor Seymour's research has 3 major themes: the relationship between oral disease and systemic conditions, primarily atherosclerosis, the immunopathogenesis of periodontal disease using immuno- and molecular pathology and the effect of environmental factors on gingival fibroblast gene expression profiles. In terms of the relationship between periodontal disease and atherosclerosis, his research has focussed on molecular mimicry as the link between the two diseases. In addition, the peripheral blood and salivary transcriptomes are being investigated to identify specific gene expression profiles associated with disease progression, while the effect of environmental factors such as smoking and the use of bisphosphonates on gingival fibroblast gene expression profiles are also being investigated.

Research and Collaboration

Professor Seymour's research over 2007 and 2008 has primarily been directed at understanding susceptibility to periodontal disease and its relationship to systemic diseases. In this context, a metagenomic approach is being used to carry out large-scale species surveys of the oral microbiota in both health and disease. This study is in collaboration with Dr Nick Heng and Associate Professor Mary Cullinan. An international collaborative study using salivary metagenomics is being set up to identify early markers of periodontal disease for use in large-scale multidisciplinary studies investigating the relationship between oral and systemic diseases. International collaborative studies with Dr Pauline Ford of the University of Queensland and Professor Kazuhisa Yamazaki of Niigata University have continued to investigate the role of molecular mimicry as the link between periodontal disease and atherosclerosis. In this context, *Porphyromonas gingivalis* GroEL-specific T cell clones are being adoptively transferred into apoE deficient mice to enhance atherosclerosis.

Studies on the role of Th17 and Treg cells in the immunopathogenesis of periodontal disease and oral squamous cell carcinoma, in association with Associate Professor Alison Rich, are continuing. As well, studies on the role of Toll-like receptors in oral lichen planus and oral squamous cell carcinoma have also been carried out as part of the work of Molecular and Immunopathology Research Group of the Sir John Walsh Research Institute.



Recent Publications

Ford, P.J., Gemmell, E., Timms, P., Chan, A., Preston, F.M., and Seymour G.J. (2007). Anti-Pgingivalis Response Correlates with Atherosclerosis. *Journal of Dental Research* 86, 35-40.

Pongnarisor, N.J., Gemmell, E., Tan, A.E.S., Henry, P.J., Marshall, R.I., and Seymour, G.J. (2007). Inflammation associated with implants with different surface types. *Clin Oral Implants Res* 18, 114-125.

Hamlet, S.M., Taiyeb-Ali, T.B., Cullinan, M.P., Westerman, B., Palmer, J.E., and Seymour, G.J. (2007). Tannerella forsythensis prrH genotype and association with periodontal status. *Journal of Periodontol* 78, 344-350.

Seymour, G.J., Ford, P.J., Cullinan, M.P., Leishman, S., and Yamazaki, K. (2007). Relationship between periodontal infections and systemic disease. *Clinical Microbiology and Infection* 13, 3-10.

MIKE SWAIN

BSc PhD
Oral Rehabilitation
Professor



The major platform for this research has been a sustained focus on trying to understand the basic role of microstructure on the mechanical response of materials. This has required a genuine integration of basic principles of mechanics, novel approaches to quantify microstructure and properties at the micro level as well as a genuine appreciation of the biological conditions influencing behaviour. To this end Professor Swain has made major advances with the use of nano-indentation to quantify mechanical properties as well as developed strategies for quantifying mineral properties and gradients of calcified biological tissue using microCT.

Research and Collaboration

The major role of research in the period 2007-2008 has been in the area of deformation response of teeth. This has entailed collaborative research with The University of Sydney, as well as the Technical University of Hamburg Harburg in Germany (Professor G. Schneider) and The University of Pardubice in the Czech Republic (Professor J Mencik). The latter collaboration has addressed the issue of deformational creep response associated with the presence of remnant proteins in enamel. In the case of The University of Sydney (Associate Professor Q. Li), the collaboration has been in the development of numerical modeling of the deformation and fracture of dental materials and restorative systems, as well as in the area of bone remodeling in the oral cavity associated with orthodontics and dental implants.

Recent Publications

Xie, Z.H., Swain, M.V., Munroe, P.R., and Hoffman, M. (2008). On the critical parameters that regulate the deformation behaviour of tooth enamel. *Biomaterials* 29, 2697-2703.

Ichim, I., Li, Q., Li, W., Kieser, J.A., and Swain, M.V., (2007). Modelling of Fracture Behaviour in Biomaterials. *Biomaterials* 28, 1317-1326.

He, L.H., and Swain, M.V. (2007). Influence of environment on the mechanical behaviour of mature human enamel. *Biomaterials* 28, 4512-4520.



ANDREW TAWSE-SMITH

DDS Cert Perio
Oral Sciences
Senior Lecturer

Dr Tawse-Smith is involved in the prospective evaluation on patients rehabilitated with implant supported mandibular overdentures. Evaluations have included clinical outcomes (success rates), hard and soft tissue interface (Peri-implant health) and different treatment loading modalities.

At the Colombian School of Dentistry period (2007-2008), he carried out prospective evaluation of patients rehabilitated with implant-supported removable partial dentures: Multicentre study, Institucion Universitaria Colegios de Colombia, Faculty of Dentistry - Colombian School of Dentistry, University of Otago, New Zealand and Amphia Teaching Hospital Breda, Netherlands. Additionally, he carried out periodontal research.

Research and Collaboration

Dr Tawse-Smith worked overseas at the Colegio Odontologico Colombiano during this period. Key collaborations with Otago University were in prospective evaluation of patients rehabilitated with implant-supported overdentures. Additionally, there is an ongoing multicentre study (3 centres) on removable partial dentures supported by ITI dental implants, evaluation on patient satisfaction and clinical outcomes.

Recent Publications

Tawse-Smith, A., Campuzano, G., Alvarez, S., Forero, C., González, R., Rodríguez, E., and Guzmán, A. (2008). Relacion de la estabilidad inicial de Implantes ITI®, medida con torcometro manual y analisis de Frecuencia de Resonancia (Osstell®). *Una evaluacion Clinica Journal Odontologico Colegial* 2, 14-20.

Jaramillo J.C., Montes, L.F., Carrillo, Y., Restrepo, M., and Tawse-Smith, A. (2008). Prevalencia de la Recesion gingival con respecto a factores de riesgo en escolares de siete a catorce años en Colombia. *Journal Odontologico Colegial* 1, 36-43.

Hein, C., Fine, D., Lamster, I.B., Oppermann, R.V., Rekow, D., Sanz, M., and Tawse-Smith, A. (2007). Proceedings and Consensus Opinion from Global Oral and Systemic Health Summit: Present and Future Directions. Grand Rounds in Oral-Systemic Medicine, Supplement, Feb. 1-20.

W MURRAY THOMSON

BSc BDS MComDent MA PhD FICD FADI
Oral Sciences
Professor

Professor Thomson conducts research into (1) the oral health of the population, and (2) the way in which dental health services work (or don't work). In order to do this, he uses a number of different approaches, including prospective cohort studies (most notably the Dunedin Multidisciplinary Health and Development Study), surveys, secondary analyses of existing data-sets, and qualitative investigations. Most of his research is undertaken collaboratively. During the 2007-2008 period, he published 25 papers in the peer-reviewed scientific literature.

Research and Collaboration

Key projects undertaken during 2007-2008 include:

Ongoing work in the Dunedin Multidisciplinary Health and Development Study (key collaborations with colleagues in Preventive & Social Medicine (OU; most notably Poulton, R., and Williams, S.M.), the University of Toronto (Locker, D and Lawrence, H.P.), and Duke University (Caspi, A., and Moffitt, T.E.))

Ongoing gerodontological research; and

Dental health services research (key collaborations with NZ colleagues Ayers, K.M.S., Malden, P.E., Sussex, P.V., Foster Page L.A., and Shearer, D.M., and with Newton J.T. in London).

Recent Publications

Thomson, W.M., Poulton, R., Broadbent, J.M., Moffitt, T.E., Caspi, A., Beck, J.D., Welch, D., and Hancox, R.J. (2008). Cannabis smoking and periodontal disease among young adults. *Journal of the American Medical Association* 299, 525-531.

Broadbent, J.M., Thomson, W.M., and Poulton, R. (2008). Trajectory patterns of dental caries experience to the fourth decade of life. *Journal of Dental Research* 87, 69-72.

Thomson, W.M., Broadbent, J.M., Welch, D, Beck, J.D., and Poulton, R. (2007). Cigarette smoking and periodontal disease among 32-year-olds: a prospective study of a representative cohort. *Journal of Clinical Periodontology* 34, 828-834.





GEOFFREY TOMPKINS

BSc PhD Postgraduate Diploma of Science
Oral Sciences
Senior Lecturer

Dr Tompkins' qualifications are in microbiology and he has worked in oral/dental bacteriology for the past 25 years (including graduate studies and postdoctoral appointment). He has been involved in a variety of research including a Marsden Fund-supported project. His current interests include:

1. Heme/iron acquisition by periodontal anaerobic bacteria (no students involved during the reporting period).
2. Application of molecular microbiology to forensic analysis of bite marks. One PhD student has been involved during the assessment period.
3. Evaluation of antimicrobials in an *ex vivo* endodontic infection model. Two DCLinDent students were involved during the reporting period. One manuscript has been submitted (currently under revision) and another has been drafted.

Research and Collaboration

1. Heme/iron acquisition by periodontal anaerobic bacteria. Dr Tompkins spent nine months of 2008 and three months of 2009 on research and study leave and devoted most of this leave to this project. This included four months spent working in the Collaborative Research Centre of the Melbourne School of Dentistry (University of Melbourne) in the laboratory of Professor Eric Reynolds. His immediate collaborators in Melbourne were Dr: Catherine Butler and Dr: Christine Sears. The purpose of the study leave period was to learn techniques involved in the development of "knockout" mutants of *Porphyromonas gingivalis* – a heme-requiring organism implicated in periodontal disease.
2. Application of molecular microbiology to forensic analysis of bite marks. This project is in collaboration with Dr: Jo-Ann Stanton (Dept. Anatomy and Structural Biology) and Professor Jules Kieser. The aim of the project is to assess the feasibility of microbial genotyping in the forensic analysis of bitemarks.

3. Evaluation of antimicrobials in an *ex vivo* endodontic infection model. This project is in collaboration with Associate Professor Nicholas Chandler, Mrs. Tina Hauman and Dr. Jonathan Leichter. The purpose is to adapt fluorescent nucleic acid-binding dyes to enable visualization and quantification of live and dead bacteria within the dentinal tubules of an *ex vivo* root canal infection model.

Recent Publications

Heng, N.C.K., Tagg, J.R., and Tompkins, G.R. (2007). Competence-dependent Bacteriocin Production by *Streptococcus gordonii* DLI (Challis). *Journal of Bacteriology* 189, 1468-1472.

DARRYL TONG

BDS MBChB MSD CertOMS FFDRCSI FDSRCS FACOMS
Oral Diagnostic and Surgical Sciences
Senior Lecturer

Clinically-based research involving oral and maxillofacial surgery, which includes dentoalveolar surgery, pathology, trauma, dental implantology, systematic reviews and epidemiological studies of clinical aspects of the specialty. Of particular interest, however, is maxillofacial trauma and ballistic injury, especially in theatres of conflict. Currently enrolled in PhD looking at war injuries of the face and jaws; this has a historical component describing the evolution and development of war surgery of the face and jaws from ancient to modern times (Afghanistan and Iraq); a surgical audit component utilising the unique HP Pickerill Collection at the Hocken Library, and case matching with contemporary patients from Afghanistan and, finally, an evidence-based systematic review component looking at contemporary aspects of war surgery of the face and jaws which would allow non-specialist clinicians in the field to deal with maxillofacial injuries with more confidence.

Research and Collaboration

Key collaborative research efforts conducted within and outside the school of dentistry include the development of a facial trauma stabilisation device with Mr Neil Waddell (Dental Technology) and Otago Innovation Limited which has been awarded a provisional US patent and is currently undergoing commercialization appraisals; epidemiological studies with Professor Murray Thomson (Community Dentistry) following a successful NZDA Research Foundation grant looking at the referral patterns and initial management of maxillofacial trauma among general medical and dental practitioners in NZ; collaborative research with Dr Debra Carr (Textiles); Professor Tom Brooking (History) and Professor Ross Beirne (OMS) from the University of Washington, all involved with PhD research on war injuries of the face and jaws.

Future research collaborations include a veterans' health project conducted by Veterans Affairs NZ (VANZ) and conducted in part by members of the dept of Preventive and Social Medicine, implantology research with Dr Warwick Duncan (Oral Sciences) and Forensic Biology research involving gunshot wounds to skulls with the Forensic Biology Group, headed by Professor Jules Kieser.

Recent Publications

Tong, D.C., Bamji, A.N., Brooking, T.W.H., and Love, R.M. (2008). Plastic Kiwis – New Zealanders and the development of a specialty. *Journal of Military and Veterans' Health* 17, 11-18.

Tong, D.C., and Theis, J. (2008). Antibiotic prophylaxis and invasive dental treatment in prosthetic joint patients. *New Zealand Medical Journal* 121, 45-52.

Kirk, D. G., Liston, P.N., Tong, D.C., and Love, R.M. (2007). The influence of two different flap designs on the incidence of pain, swelling, trismus and alveolar osteitis in the week following third molar surgery. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontology* 104, e1-e6 (electronic on-line article).



LUDWIG JANSEN VAN VUUREN

MTech BTech NDip
Oral Rehabilitation
Lecturer

Research related to mechanical and other physical properties of dental biomaterials

Recent Publications

Jansen van Vuuren, L., Pistorius, P.C., and Odendaal, J. S. J. (2008). Galvanic corrosion between dental cobalt-chromium and dental amalgam in artificial saliva. *Journal of the South African Dental Association*. 63, 1-2.

Jansen van Vuuren, L., Jansen van Vuuren, W. A., and Van Eeden, R; (2007). Esthetic and practical method of using a glass composite veneering material to fabricate the artificial soft tissue on a full arch titanium Procera implant bridge. *International Dentistry South Africa* 9, 4.

Jansen van Vuuren, L., Jansen van Vuuren, W. A., and Van Eeden, R. (2007). Esthetic and practical method of using a glass composite veneering material to fabricate the artificial soft tissue on a full arch titanium Procera implant bridge. *International Dentistry South Africa: Australian edition* 2, 3.

NEIL WADDELL

MDipTechDentTech HDE PGDipCDTech
Oral Rehabilitation
Senior Lecturer

Neil Waddell's research platform is cranio-facial biomechanics, with a special focus on prosthodontics, failure mechanisms and adhesion of dental restorations and materials, and forensics.

Research and Collaboration

Within the Faculty of Dentistry, he is involved with the following research groups:

Payne, A.G.T., Swain, M.V., and Kieser J. Failure of bar attachment systems in implant overdentures, Oral Implantology Area of Research Strength.

Kieser, J.A., Thomson, W.M., Swain, M.V., and Farella, M. Intra-oral Pressure Dynamics.

Neil's other national and international collaborations are;

Kieser, J.A., Taylor, M., Nicholson, H.D., Swain, M.V., and Walsh, K. Collaborative group between the School of Dentistry, the Department of Anatomy and Structural Biology and the Forensic Science Department of Environmental Science and Research, investigating Sharp and Blunt Force Trauma, Skin/Skull/Brain Wound Ballistics and Blood Spatter:

Kieser, J.A., and Bernal, V. Collaborative study on The Uniqueness of the Human Anterior Dentition, a Procrustes Analysis between the School of Dentistry and Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, Argentina.

Kieser, J.A., Pullen, A.J., Brondlund, J., Foster, K., Swain, M.V., and Ichim, I. Collaborative group between School of Dentistry, the Bioengineering Institute - Auckland University; Institute of Food Nutrition and Human Health - Massey University; School of Dentistry/Oral Health Centre of Western Australia - The University of Western Australia, investigating Craniofacial Mastication.

Rohrle, O., and Sani, H. Collaborative group between School of Dentistry and the Institute of Applied Mechanics, Stuttgart University, investigating virtual articulation in dental CAD/CAM applications.



Recent Publications

Waddell, J.N., Payne, A.G.T., Swain, M.V., and Kieser, J.A., Scanning Electron Microscopy Observations of Failures of Implant Overdenture Bars: A Case Series Report, – *Clinical Implant Dentistry Related Research* Published Online: Oct 17 2008.

Kudo, S., Vennell, R., Wilson, B., Waddell, J.N. and Sato Y. (2008). Influence of surface penetration on measured fluid force on a hand model, *Journal of Biomechanics* 41, 3502-3505.

Waddell, J.N., Ichim, I., Lee, H., Fangtao, L., Payne, A.G.T., and Swain, M.V., (2007). Fatigue Failures of Bar-attachment Brazed Joints for Implant Supported Overdentures. *Engineering Fracture Mechanics* 74, 1148-1159.

Tholey, M.J., Waddell, J.N., and Swain, M.V. (2007). Influence of the bonder on the adhesion of porcelain to machined titanium as determined by the strain energy release rate, *Dental Materials* 23, 822-828.



Lynda Horne and Sharla Kennedy looking down a double headed microscope at a histological stained slide.

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Sir John Walsh Research Institute	Jules Kieser	jules.kieser@otago.ac.nz	32

Winners of the International Association for Dental Research



IADR Colgate Poster Competition

April 2008

Marina Bakri was the winner in the International Association for Dental Research (IADR) Colgate Poster Competition Postgraduate student award in Dunedin for her study on the Role of *Candida albicans* in pre-cancerous oral lesions.

Lye Ng won the Junior Category of the IADR Colgate Poster Competition for her research on Toll-like Receptor 2 Expression in Oral Squamous Cell Carcinoma, Epithelial Dysplasia and Irritative Hyperplastic Lesions.

Following their win in Dunedin, Marina and Lye competed in the IADR Colgate Poster Competition in Perth, Australia, where Marina received 1st prize in the Senior Section and Lye received 1st prize in the Junior Section.

As winners of the IADR Colgate Poster Competition in Perth, Lye and Marina will compete in the IADR Unilever Hattan Award Competition held in Miami Florida in April, 2009.

Lye was also a Finalist in the Otago Medical School Research Society (OMSRS) competition in August 2008.



Dental student wins top international dental research prize

July 2008

Shilpa Raju, who graduated last year from the University of Otago School of Dentistry, won the prestigious Hatton Competition at the International Association for Dental Research (IADR) conference in Toronto, Canada.

Shilpa investigated how proteins in the human fungal pathogen *Candida albicans* pump drugs out of cells and make the fungus drug-resistant. Her research was selected by the New Zealand branch of the IADR to compete in the Australasian IADR Colgate poster competition in South Australia, last year. She won that competition and received a travel grant to enable her to compete in the Unilever Hatton Competition. Here she was up against dental students from North America, Latin America, Europe, Asia, Africa and the Middle East.

Her research was carried out as a summer research project supported by a New Zealand Dental Association Research Foundation summer studentship and the NIH (USA).



Masters student wins research fellowship funding

August 2008

Faculty of Dentistry student Darnell Kennedy has won a Te Tipu Pūtaiao Fellowship from the Foundation for Research, Science and Technology for research which has potential to generate significant new knowledge likely to benefit New Zealand.

The fellowship will assist Darnell over the next two years to develop and evaluate a method that compares DNA profiles of the streptococcus bacteria found on teeth and in bite marks on human skin.

Her aim is to use the research to build an effective forensic tool to trace perpetrators of violent crimes while simultaneously profiling the streptococcal found in mouths of Māori and non Māori.

The research will investigate the effects of different streptococcus bacteria on Māori oral health, using state of the art molecular biology.

“My work will eventually contribute to combating periodontal diseases among Māori and will also meet a national need to develop better and more objective forensic techniques to help combat family violence and abuse among Māori and Pakeha,” says Darnell.

The fellowships are designed to unlock the innovation potential of Maori knowledge, resources and people for the benefit of New Zealand. The Foundation offers them to Masters, PhD and Postdoctoral students and Bridge to Employment recipients.

“The focus of the Te Tipu Pūtaiao fellowship scheme is to foster the development of New Zealand’s emerging scientists and build a stronger research community. Māori have a positive contribution to make to the research, science and technology sector,” says the Foundation’s Strategy Manager for Māori Research and Innovation, Pereri Hathaway.

“This scheme is one way of supporting young researchers and encouraging Maori students into science careers,” he says.

“We need to acknowledge and utilise the distinct and unique knowledge and contribution that Māori have to offer to the science and research community, and the scheme encourages our fellows to work collaboratively with Māori on research projects, resulting in good research outcomes for New Zealand,” says Mr Hathaway.



University of Otago Scholarship

Don Schwass was awarded a University of Otago Scholarship in 2007.

Don studied towards a Doctor of Clinical Dentistry degree, specialising in Prosthodontics. Doctoral research was conducted into treatment of dental caries using an Er:YAG laser which was guided by laser induced fluorescence of infected tissue to guide its removal. Title of thesis: 'Micro-CT application for quantifying fluorescence controlled Er:YAG laser ablation of carious dentine'. Findings arising from this research have been published in the journal, Caries Research. Further publication based on this research is anticipated

Barossa Valley, South Australia

September, 2007

The South Australian branch of the Australian and New Zealand Division of the International Association for Dental Research hosted the 47th Annual Meeting in the Barossa Valley in South Australia.

School of Dentistry student Shilpa Raju won the undergraduate section of the Colgate Poster Competition for her research on the functional analysis of phosphorylation sites in *Candida albicans* Cdr1p.

Second place in that competition went to fellow School of Dentistry student Lillian Hsu whose research project compared the DNA of *streptococcal* strains amplified from bite marks and teeth.

In the postgraduate section, Jonathan Broadbent came second for his study on the nature and consequence of plaque trajectories.

All three students won travel awards and attended the IADR General Meeting held in Toronto in 2008.



Dentistry Summer Studentship Research Successes 2007

OTAGO MEDICAL RESEARCH FOUNDATION

Two School of Dentistry students won awards at the Otago Medical Research Foundation evening, from their research, supported by summer studentships, in the Faculty's Molecular Microbiology Laboratory.

Shilpa Raju was the winner, with her talk about her mutational study of a drug efflux transporter from the fungal pathogen *Candida albicans*. Chamil Samaranayaka was the runner-up with his talk on reconstituting recombinant subunits of the drug target DNA gyrase.

Sixteen summer students submitted abstracts and a strong field of ten students was accepted to give presentations.



CENTRE FOR GENE RESEARCH

Shilpa Raju recently also won a prize for her research at the Centre for Gene Research poster evening.

Chamil Samaranayaka was co-winner with fellow dentistry student Lillian Hsu of the local International Association for Dental Research (IADR) Junior Student Poster Competition, which was held in conjunction with the Faculty of Dentistry 3M Research Day.

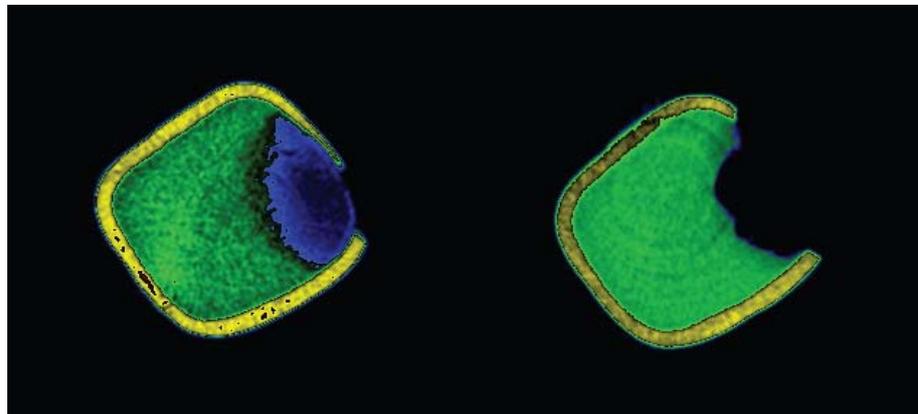
Lillian's summer research project compared the DNA of *streptococcal* strains amplified from bite marks and teeth.

All three students received financial support to attend the IADR regional competition held in Adelaide.

DENTSPLY JUNIOR CLINICIAN COMPETITION

Another dentistry summer studentship holder, Rita Keng, was placed second in the Dentsply Junior Clinician Competition held by the Australian Dental Association at its meeting in Sydney. She presented her characterisation of a novel inhibitor of the plasma membrane proton pumps of fungal pathogens.

As the 2006 winner IADR regional competition in Brisbane, Rita travelled from Sydney to participate in the Hutton Junior Investigator Competition at the IADR meeting in New Orleans.



Dentine caries before and after ablating with Er:YAG laser

Enrolled Post Graduate Students 2007 - 2008

PhD

Name	Title of Research Project	Primary Department	Supervisors
Nabeel Alsabeeha	Mandibular implant overdentures for older adults. An in vitro assessment to develop a novel attachment system	Oral Rehabilitation	Associate Professor AGT Payne
Momen Atieh	Interventions for replacing missing teeth: oral implants in molar extraction sockets (delayed, early and immediate placement) restored with single implant crowns	Oral Rehabilitation, Oral Sciences, Oral Diagnostic & Surgical Sciences	Associate Professor AGT Payne
Katie Ayers	The dental workforce in New Zealand	Oral Sciences	Professor WM Thomson Associate Professor AM Rich
Marina Mohd Bakri	Acetaldehyde metabolism in candida albicans and its role in oral cancer	Oral Sciences	Professor R Cannon
Jonathan Broadbent	Oral health inequalities to the fourth decade of life	Oral Sciences	Professor WM Thomson Professor R Poulter
Gemma Dickson	Marine decomposition and bacterial succession as a forensic indicator of postmortem submersion interval	Biochemistry OSMS	Professor J Kieser Associate Professor K Probert
Jennifer Doss	HR-QoL measurement for oral cancer patients in Malaysia	Oral Sciences	Professor WM Thomson Associate Professor B Drummond
Rami Farah	An in-vivo and in-vitro assessment of the bonding strength of different restorative materials to hypoplastic and hypomineralised enamel	Oral Sciences	Associate Professor B Drummond Professor MV Swain
Frank Fischer	Inhibition of Candida albicans adherence by immunoglobins	Oral Sciences	Dr A Holmes
Lyndie Anne Foster Page	Malocclusion and orthodontic care: a health service investigation	Oral Sciences	Professor WM Thomson Professor J Kieser Mr A Quick
Amanda George	Disease in prehistoric New Zealand and the Chatham Islands	Department of Anthropology, Gender & Sociology	Professor J Kieser Associate Professor R Walter

Name	Title of Research Project	Primary Department	Supervisors
David Healey	Expectations and satisfaction with orthodontic treatment	Oral Sciences	Professor WM Thomson Associate Professor R Gauld
Haizal Mohd Hussaini	Immune response in tissue and peripheral blood in oral cancer patients	Oral Diagnostic & Surgical Sciences,	Associate Professor A Rich
Anil Jalaludin	Biofouling	Department of Chemistry	Associate Professor J McQuillan Associate Professor P Bremer Dr B.C. Monk
Jacqui Kao	Identification of buccal and vaginal cells	Department of Chemistry	Professor K Gordon Professor M Eccles Professor J Kieser
Darnell Kennedy	Microbial analysis of bitemarks by sequence comparison of streptococcal 16S rDNA	Oral Sciences	Dr G Tompkins Dr J Stanton Professor J Kieser
Dusan Kuzmanovic	Effect of endodontic access cavities on the structural integrity of all-ceramic crowns	Oral Diagnostic & Surgical Sciences	Professor R Love
Karl Lyons	Biofilm formation on prosthetic materials used to restore maxillary resection defects	Oral Rehabilitation	Professor R Cannon
Karen Matejka	Biofilm characteristics of <i>Moraxella catarrhalis</i>	Food Sciences	Associate Professor P Bremer Dr G Tompkins
Alison Meldrum	Challenging dominant epistemologies: professional education in Dentistry	Higher Education Development Centre	Professor J Kieser Dr T Harland
Albert Nguyen	Investigating the Protease Tex31	School of Pharmacy	Dr J Tyndall Pharmacy Dr BC Monk
Praveen Parachuru	Characterisation of CD4 CD25 Foxp3 and Th17 positive cells in periodontal disease	Oral Sciences	Professor G Seymour
Andrew Quick	The influence of orthodontic and orthognathic therapy on mandibular motion	Oral Sciences	Professor J Kieser Professor P Herbison Dr G Johnson
Ely Rodrigues	Role of sexual recombination in <i>Candida albicans</i> biology	Oral Sciences	Professor R Cannon
Michael Tholey	Interface between Zirconia and veneering porcelain	Oral Rehabilitation	Professor M Swain Professor J Kieser

Name	Title of Research Project	Primary Department	Supervisors
Darryl Tong	An evidence-based analysis of maxillofacial war injuries: Aspects of contemporary war surgery	Oral Diagnostic & Surgical Sciences	Professor R Love
Neil Waddell	Physical and metallurgical assessment of bar-joint and bar-attachment solder joints in implant overdentures; an in-vitro study	Oral Rehabilitation	Professor M Swain Professor J Kieser
Sam White	Resolution of complex mitochondrial mixtures for forensic applications	Department of Biochemistry	Associate Professor R Poulter Professor J Kieser Dr S Cordiner

DClinDent

Jaffar Abduo	Fit of implant fixed ceramic partial denture frameworks	Oral Rehabilitation Prosthodontics	Professor M Swain Dr V Bennani Mr K Lyons Mr N Waddell
Osama Alothmani	Theory and practice of endodontic measurement and assessment using radiographs	Oral Rehabilitation Endodontics	Associate Professor N Chandler Mrs L Friedlander Professor B Monteith
Ross Anning	A survey of postgraduate orthodontic students worldwide	Oral Sciences Orthodontics	Professor M Thomson Mr A Quick
Abdul Aziz	Disinfection of root-end cavity; a confocal microscope bacterial vitality study	Oral Rehabilitation Endodontics	Associate Professor N Chandler Mrs C Hauman Associate Professor N Chandler Dr G Tompkins Mr J Leichter
Adinar Baharuddin	RANKL, RANK and OPG expression in surgically created periodontal defects in sheep	Oral Sciences Periodontology	Dr W Duncan Mr D Holborow Dr T Milne Professor G Seymour
Karthika Balaji	Acquisition of oral bacteria in children with Down Syndrome compared with their siblings	Oral Sciences Paediatric	Associate Professor B Drummond Associate Professor M Cullinan Dr N Heng Mrs A Meldrum
Simon Brown	Ceramic single crowns on oral implants placed in extraction sockets	Oral Rehabilitation Prosthodontics	Associate Professor AGT Payne Professor M Swain Mr D Purton Associate Professor R De Silva

Name	Title of Research Project	Primary Department	Supervisors
Chee Chang	The effect of diamond bur adjustment with a dental handpiece on all-ceramic veneering porcelain	Oral Rehabilitation Prosthodontics	Professor M Swain Mr K Lyons Mr N Waddell
Patty Chou	Gene-array analysis of the effect of smoking upon gingival and/or PDL fibroblasts	Oral Science Periodontology	Professor G Seymour Dr T Milne Associate Professor M Cullinan
Shalin Desai	Expression of toll-like receptors-2 in periapical lesions of endodontic origin	Oral Rehabilitation Endodontics	Professor R Love Associate Professor A Rich Professor G Seymour
Daniel Fitzbiggon	Immediately-loaded Branemark TiUnite implants in the sheep mandibular model	Oral Science Periodontology	Dr W Duncan Mr D Holborow Professor G Seymour
Benjamin Gaffey	The effect of continuous tensile strain on RANKL, OPG, M-CSF and IL1 β by periodontal ligament fibroblasts <i>in vitro</i>	Oral Sciences Orthodontics	M Meikle Dr T Milne
Samuel Goldsmith	Influence of pedicle flap design on healing and postoperative sequelae after lower third molar tooth removal	Oral Diagnostic & Surgical Sciences Oral Surgery	Professor R Love Mr D Tong Associate Professor R De Silva
Siti Hamzah	Oral health care of people with special needs in Malaysia – A situational analysis and the development of special needs dentistry service	Oral Diagnostic & Surgical Sciences Special Needs	Professor R Love Miss E MacFadyen
Noren Hasmun	The impact of environmental tobacco smoke on preschool-aged child oral health	Oral Sciences Paediatric	Associate Professor B Drummond Associate Professor M Cullinan Dr N Heng Professor G Seymour
Faizal Hidayat	Use of salivary transcriptomes to identify patients susceptible to periodontal diseases	Oral Sciences Periodontology	Mr D Holborow Mr J Leichter Associate Professor M Cullinan Dr N Heng Professor G Seymour
Andrea Kelsen	Could we be doing more to look after the oral health of our institutionalized older people?	Oral Diagnostic & Surgical Sciences Special Needs	Professor R Love Professor WM Thomson Miss E MacFadyen

Name	Title of Research Project	Primary Department	Supervisors
Betty Keng	A clinical comparison between preformed Japanese NiTi and titanium molybdenum alloy T-closing loops during orthodontic space closure	Oral Science Orthodontics	Mr A Quick Professor M Swain Associate Professor P Herbison
Daniel Kennedy	Use of a newly developed technique to measure introral pressures during mastication, swallowing and speech	Oral Sciences Orthodontics	Professor Jules Kieser Professor M Swain
James Kim	Immediately-loaded 3i Osseotite NT implants in the sheep mandibular model	Oral Science Periodontology	Dr W Duncan Mr J Leichter Mr D Holborow Professor G Seymour
Doris Lam	Gene-array comparison of the effect of gingivitis and periodontitis upon peripheral lymphocytes	Oral Science Periodontology	Professor G Seymour Associate Professor M Cullinan Dr N Heng Mr D Holborow Dr T Milne
Emily Lam	Remineralization of decalcified tooth enamel consequent to orthodontic treatment	Oral Sciences Orthodontics	Mr A Quick Professor J Kieser Professor M Swain
Jack Lin	The optimum electrode placement site for electric pulp testing of first molar teeth	Oral Rehabilitation Endodontics	Associate Professor N Chandler Mr D Purton Professor R Love
Kimmy Lin	Immunohistochemical localization of TLR2, TLR4 and RANK/RANKL /OPG system in inflammatory root resorption	Oral Rehabilitation Endodontics	Professor R Love Mrs L Friedlander Associate Professor A Rich Professor G Seymour
Sunyoung Ma	Marginal bone loss around mandibular implant overdentures	Oral Rehabilitation Prosthodontics	Associate Professor AGT Payne Professor WM Thomson Associate Professor R De Silva
Andrew Mackie	Mandibular 2-implant overdentures: Prosthodontic maintenance using different matrices with different loading strategies	Oral Rehabilitation Prosthodontics	Associate Professor AGT Payne Mr K Lyons Professor M Thomson
Tasha Mackie	Heme-binding bacteria in periodontitis	Oral Science Periodontology	Dr G Tompkins Mr D Holborow

Name	Title of Research Project	Primary Department	Supervisors
Erni Noor	Gro EL and heat shock protein 60 specific T-cells in atherosclerosis and chronic periodontitis	Oral Sciences Periodontology	Professor G Seymour Associate Professor M Cullinan
Edward Ohlrich	The effect of bisphosphonates on angiogenic gene expression by gingival fibroblasts	Oral Sciences Periodontology	Dr W Duncan Professor G Seymour Associate Professor M Cullinan Dr T Milne Dr N Heng
Cath O'Shea	The effect of functional appliances on mandibular motion	Oral Sciences Orthodontics	Mr A Quick Dr G Johnson (Physiotherapy) Professor J Kieser
Chae Park	Investigation of the relationship between bone density and mechanical properties of peri-implant bone	Oral Rehabilitation Prosthodontics	Professor M Swain Dr W Duncan Mr D Purton
Dikesh Parmar	Lasers for root canal preparation and disinfection	Oral Rehabilitation Endodontics	Mrs C Hauman Mr J Leichter Dr G Tompkins
Artika Patel	The effect of laser light on the root-end cavity and mineral trioxide aggregate (MTA) root-end filling:: a scanning electron microscope (SEM) and dye leakage study	Oral Rehabilitation Endodontics	Associate Professor N Chandler Mrs C Hauman Mr J Leichter
Mark Pinkerton	The effect of continuous tensile strain on RANKL, OPG, M-CSF and IL1 β by periodontal ligament fibroblasts <i>in vitro</i>	Oral Sciences Orthodontics	Professor M Meikle Dr T Milne
Nitin Raniga	Intra oral pressures and tongue dynamics during swallowing	Oral Science Orthodontics	Professor J Kieser Professor M Swain
Nik Rosdy	The effect of storage conditions on the detection of HPV DNA in salivary samples	Oral Diagnostic & Surgical Sciences Oral Medicine	Mr N Firth Associate Professor A Rich
Rajneesh Roy	Effect of illusions on root-end cavity preparations	Oral Rehabilitation Endodontics	Associate Professor N Chandler Mrs C Hauman Dr R O'Shea (Dpt Psychology)
Don Schwass	Quantifying autofluorescence controlled Er-YAG laser removal of carious dentine	Oral Rehabilitation Prosthodontics	Professor M Swain Mr D Purton Mr J Leichter

Name	Title of Research Project	Primary Department	Supervisors
Amna Siddiqui	Dentine tubule infection, detection and distribution in root canals	Oral Rehabilitation Endodontics	Dr G Tompkins Dr W Duncan Associate Professor N Chandler Mrs C Hauman
Suraya Sinon	Expression of toll-like receptor 2 in oral mucosal lichen planus using immunohistochemistry and quantitative real-time reverse transcriptase polymerase chain reaction	Oral Diagnostic & Surgical Sciences Oral Pathology	Associate Professor A Rich Mr N Firth
Kieran Soma	Orthodontists and orthodontic specialist practice: a mixed-method investigation	Oral Science Orthodontics	Professor WM Thomson Miss W Harding Ms K Morgaine
Ling Feng Soo	A comparative, in-vivo study of an Er:YAG Laser, ER:YSGG Laser, ultrasonic scaling and hand scaling/root planning for periodontal treatment	Oral Science Periodontology	Mr J Leichter Professor G Seymour Associate Professor M Cullinan
Kimberley Timmins	Aspects of cervical growth and dental development in New Zealand children	Oral Sciences Orthodontics	Professor J Kieser Miss W Harding Professor WM Thomson
Rajiv Verma	Retrospective analysis of clinical and microbiological status of patients provided with dental implants at the School of Dentistry	Oral Science Periodontology	Dr W Duncan Professor G Seymour Associate Professor M Cullinan
Darryl Violich	Effect of the smear layer on the prepometer dentine measuring instrument	Oral Rehabilitation Endodontics	Associate Professor N Chandler Mr D Purton Professor M Swain
David Wescott	A cDNA microarray analysis of the effect of intermittent tensile mechanical strain on the expression of osteogenic genes by cultured human periodontal ligament cells	Oral Sciences Orthodontics	Dr T Milne
	Professor M Meikle		

MDS/GPD, MDS/MBChB, MHealSc, MSc

Name	Title of Research Project	Primary Department
Danny Areai	MDS/GPD	Oral Diagnostic & Surgical Sciences
Karyn Becconsall-Ryan	MDS/PGDipClinDent	Oral Sciences
Jessica Buchanan	MDS/MBChB	Oral Diagnostic & Surgical Sciences
Duncan Campbell	MDS/MB ChB	Oral Diagnostic & Surgical Sciences
Han Choi	MDS/MB ChB	Oral Diagnostic & Surgical Sciences
Rakesh Jattan	MDS/MB ChB	Oral Diagnostic & Surgical Sciences
Prakash Hasvin Patel	MDS/MB ChB	Oral Diagnostic & Surgical Sciences
Yoganathan Ponnambalam	MHealSc	Oral Diagnostic & Surgical Sciences
Gemma Radford	MSc	Oral Sciences
Kumanan Selvarajah	MDS	Oral Diagnostic & Surgical Sciences
Poonam Verma	MDS/GPD	Oral Diagnostic & Surgical Sciences
Anura Vyagurunathar	MDS	Oral Diagnostic & Surgical Sciences

MComDent, PGDipComDent

Name	Title of Research Project	Primary Department	Supervisors
Robyn Haisman	MComDent	Oral Sciences	Professor WM Thomson
Elizabeth Hitchings	MComDent	Oral Sciences	Professor WM Thomson
Paopio Luteru	PGDipComDent	Oral Sciences	Professor WM Thomson
Victoria McKelvey	MComDent	Oral Sciences	Professor WM Thomson Ms KC Morgaine
Tule Misa	MComDent	Oral Sciences	Professor WM Thomson Ms LA Foster-Page
Dara Shearer	MComDent	Oral Sciences	Professor WM Thomson

MDentTech, PGDipCDTech

Name	Title of Research Project	Primary Department
Lu Bao	PGDipCDTech	Oral Rehabilitation
Lee Carlye	PGDipCDTech	Oral Rehabilitation
Julian Coates	PGDipCDTech	Oral Rehabilitation
Gordon Damon	PGDipCDTech	Oral Rehabilitation
Shareen Elshiyab	MDentTech	Oral Rehabilitation
Sian Griffith	PGDipCDTech	Oral Rehabilitation
Roger Guthrie	PGDipCDTech	Oral Rehabilitation
Leslie Lamb	PGDipCDTech	Oral Rehabilitation
Claire Macbeth	PGDipCDTech	Oral Rehabilitation
Gareth McMurdo	PGDipCDTech	Oral Rehabilitation
Susan Merrick	PGDipCDTech	Oral Rehabilitation
John Morris	PGDipCDTech	Oral Rehabilitation
Matthew Partridge	PGDipCDTech	Oral Rehabilitation
Tristan Pattinson	PGDipCDTech	Oral Rehabilitation
Pagiranam Prajumas	PGDipCDTech	Oral Rehabilitation
Sivalingam Des Reddy	PGDipCDTech	Oral Rehabilitation
Daniel Squire	PGDipCDTech	Oral Rehabilitation
Michael Tapealava	PGDipCDTech	Oral Rehabilitation
Boris Tinone	PGDipCDTech	Oral Rehabilitation



Microtome in a refrigerated chamber minus 20 degrees C- PhD student Praveen Parachuru freezing and cutting frozen tissue for Immunohistochemistry and Immunofluorescence

Visiting Research Fellows

2007

PERIOD OF VISIT	NAME	HOME UNIVERSITY	RESEARCH/SPECIAL INTEREST
24 September – 6 December	Dr S M Lal	Fiji School of Medicine	Oral Sciences

2008

PERIOD OF VISIT	NAME	HOME UNIVERSITY	RESEARCH/SPECIAL INTEREST
6 January – 30 April	Professor Karl-Erik Kahnberg	University of Gothenburg, Sweden	Oral Maxillofacial Surgery/Implants/ Grafting
20 February – 10 April	Professor Niklaus P Lang	University of Bern, Switzerland	Periodontology
9 July – 28 August	Professor Finbarr Allen	National University of Ireland Cork, Ireland	Prosthodontics
20 February – 10 April	Mrs B Hui Lang-Hua Postgraduate Visiting Fellow	University of Bern, Switzerland	Periodontology
6 March – 30 May	Dr Jorge A Gamonal Postgraduate Visiting Fellow	University of Santiago, Chile	Periodontology
17 November – 15 December	Associate Professor Hiroji Chibana Postgraduate Visiting Fellow	Chiba University	Micafungal resistance Microbial Toxicosis
13 November – 1 February	Professor Marco Aurelio Peres	Universidade Federal de Santa Caterina, Brazil	Oral Epidemiology
9 August – 30 April	Professor Ardean Nickerson	Eastern Washington University United States of America	Dental Hygiene



Research Funding 2007 - 2008

Year Approved	Project Title	Principal Investigator	Funder	Total \$
2008	Streptococcal DNA identification techniques for improved Māori health and forensics (Darnell Kennedy)	Professor J. Kieser	Foundation for Research, Science and Technology	13,719
2008	Stem cells in the apical region of immature permanent teeth from human and deer	L. Friedlander	NZ Dental Research Foundation	7,500
2008	AKTA Unichromat 1500 refrigerated cabinet for oral protein chemistry research	Dr B. Monk	NZ Dental Research Foundation	13,100
2008	Tongue pressure dynamics during eating, swallowing and speech	Professor J. Kieser	NZ Dental Research Foundation	4,895
2008	Molecular microbiology of bite marks using high-throughput DNA sequencing	Dr G. Tompkins	NZ Dental Research Foundation	8,200
2008	Satisfaction and Expectations in Orthodontic Treatment	Professor W. Thomson	NZ Dental Research Foundation	8,390
2008	A balance for dental research	Professor R. Cannon Foundation	NZ Dental Research Foundation	3,473
2008	RANKL, RANK and OPG expression in surgically created periodontal defects in the sheep model	Dr W. Duncan	NZ Dental Research Foundation	15,000
2008	Expression of pro-inflammatory cytokines and distribution of immune cell in oral squamous cell carcinoma	Associate Professor A. Rich	NZ Dental Research Foundation	9,321
2008	Fungal transporters: from resistance to new antifungals (yr 4 of grant – see 20040621)	Professor R. Cannon	National Institute of Health	343,446
2008	Influence of pedicle flap design on healing and post operative sequelae after third molar removal	S. Goldsmith	NZ Dental Research Foundation	3,000
2008	Expression of toll-like receptor 2 in oral mucosal lichen planus using immunohistochemistry and quantitative real-time reverse transcriptase polymerase chain reaction	Associate Professor A. Rich	NZ Dental Research Foundation	10,900
2008	The salivary transcriptome as a biomarker for identifying susceptibility to periodontitis	F Hidayat	NZ Dental Research Foundation	15,000
2008	Angiogenesis regulation in bisphosphonate-treated gingival fibroblasts: a study of gene expression in an in vitro wound model	E. Ohlrich	NZ Dental Research Foundation	14,632

Year Approved	Project Title	Principal Investigator	Funder	Total \$
2008	Application for a grant to purchase a nanovue Spectrophotometer	Dr N. Heng	Maurice and Phyllis Paykel Trust	10,000
2008	Quantifying autofluorescence-controlled Er:YAG laser removal of carious dentine	Dr J. Leichter	Kavo Company	13,724
2008	Structure-directed drug design (Linked to RM0020071050)	Professor R. Cannon	Japan Health Sciences Foundation	35,294
2008	Sequencing of two bacteriocin-encoding, megaplasmid-containing Streptococcus salivarius genomes a step towards targeted prevention of oral infections	Dr N. Heng	Otago Medical Research Foundation	23,801
2008	Mechanisms of micafungin resistance in Candida glabrata	Dr K. Niimi	University of Otago	34,298
2007	JSPS Japanese Professorial Visit (Prof Susumu Kajiwara)	Professor R. Cannon	Health Research Council of NZ	5,000
2007	Human membrane protein expression system. A novel protein expression system for human membrane protein analysis and drug discovery.	Professor R. Cannon	Foundation for Research, Science and Technology	1,560,001
2007	The apicectomy operation	A. Patel	Dentsply Research Fund	2,235
2007	Mechanical and structural analysis of hypomineralised dental enamel	R. Farah	NZ Dental Research Foundation	4,625
2007	The infected resected root end; effect of disinfectants and lasers on infected dentinal tubules, the smear layer and root-end seals	Associate Professor N. Chandler	NZ Dental Research Foundation	6,645
2007	The effects of different embedding resins, tissue storage methods and indentation protocols on the nanoindentation of Ovine bone tissue	Dr R. Cook	NZ Dental Research Foundation	3,113
2007	Oral and maxillofacial trauma and the general practitioner	D. Tong	NZ Dental Research Foundation	9,900
2007	The effect of smoking upon periodontal ligament fibroblasts and gingival fibroblasts: an in vitro wound model	P. Chou	NZ Dental Research Foundation	8,548
2007	GroEL and heat shock protein 60 specific T cells in atherosclerosis and chronic periodontitis	E. Noor	NZ Dental Research Foundation	8,738
2007	Gene expression of peripheral blood lymphocyte in gingivitis and periodontitis: a comparison using PCR Array	D. Lam	NZ Dental Research Foundation	9,090
2007	SpeedVac (vacuum desiccator) for oral microbial research	Dr E. Lamping	NZ Dental Research Foundation	10,000

Year Approved	Project Title	Principal Investigator	Funder	Total \$
2007	Expectation and satisfaction with orthodontic treatment (Extension to RM0020060583 Pilot Study)	Professor W. Thomson	NZ Dental Research Foundation	6,000
2007	Bite mark analysis by direct amplification and sequencing of bacterial DNA	Dr G. Tompkins	Maurice and Phyllis Paykel Trust	6,460
2007	Aspergillosis: overcoming drug resistance of an important human fungal pathogen	Professor R. Cannon	Japan Health Sciences Foundation	55,556
2007	Ultraspeed centrifugation for Dental and Medical Research	Professor R. Cannon	NZ Lottery Grants Board	79,000
2007	Metagenomics of the oral microbiota of New Zealand children as a step towards targeted prevention of dental caries	Dr N. Heng	Maurice and Phyllis Paykel Trust	7,500
2007	Metagenomics of the oral microbiota of New Zealand children as a step towards targeted prevention of dental caries	Associate Professor B. Drummond	NZ Dental Research Foundation	28,582
2007	New Zealand's oral health workforce – can it meet the community need?	S. Moffat	NZ Dental Research Foundation	5,405
2007	Immune milk to prevent tooth decay	Dr G. Tompkins	University of Otago	60,000
2007	Dentist-patient interpersonal communication and social skills evaluation of undergraduate dental students	Dr A. Hannah	University of Otago	10,045
2007	Tensile mechanical strain upregulates the expression of osteoblastic genes by periodontal ligament cells in vitro	Professor M. Meikle	University of Otago	10,310
2007	Structural resolution of recombinant DNA gyrase	Dr B. Monk	University of Otago	40,989



Beckman Coulter Ultracentrifuge for harvesting cultures at very high speeds (up to 100,000rpm). Purchased with New Zealand Lottery Grant.

Faculty Publications

2007 PUBLICATIONS

ORAL REHABILITATION

Refereed Papers

- Al-Zubeidi, M. I., & Payne, A. G. T. (2007). Mandibular overdentures: A review of treatment philosophy and prosthodontic maintenance. *New Zealand Dental Journal*, 103(4), 88-97.
- Chandler, N.P., Leichter, J.W., Oginni, A. O., & Jennings, M. (2007). Dens invaginatus: A rare case in a maxillary third molar. *ENDO*, 1(4), 279-282.
- Desai, S.V. (2007). Natural rubber latex allergy and dental practice. *New Zealand Dental Journal*, 103(4), 101-107.
- Fujisawa, N., & Swain, M.V. (2007). On the indentation contact area of a creeping solid during constant-strain-rate loading by a sharp indenter. *Journal of Materials Research*, 22(4), 893-899.
- Goga, R., & Purton, D. G. (2007). The use of endodontically treated teeth as abutments for crowns, fixed partial dentures, or removable partial dentures: A literature review. *Quintessence International*, 38, 41-46.
- Hall, J. A. G., Payne, A. G. T., Purton, D. G., Torr, B., Duncan, W. J., & De Silva, R. K. (2007). Immediately restored, single-tapered implants in the anterior maxilla: Prosthodontic and aesthetic outcomes after 1 year. *Clinical Implant Dentistry and Related Research*, 9(1), 34-45.
- Hauman, C. H. J., & Kuzmanovic, D.V. (2007). An evaluation of polymer rotary instruments' ability to remove healthy, non-carious dentine. *European Journal of Prosthodontics and Restorative Dentistry*, 15(2), 77-80.
- He, L. H., Carter, E. A., & Swain, M.V. (2007). Characterization of nanoindentation-induced residual stresses in human enamel by Raman microspectroscopy. *Analytical and Bioanalytical Chemistry*, 389, 1185-1192.
- He, L. H., & Swain, M.V. (2007). Enamel: A "metallic-like" deformable biocomposite. *Journal of Dentistry*, 35, 431-437.
- He, L. H., & Swain, M.V. (2007). Energy absorption characterization of human enamel using nanoindentation. *Journal of Biomedical Materials Research Part A*, 81A, 484-492.
- He, L. H., & Swain, M.V. (2007). Influence of environment on the mechanical behaviour of mature human enamel. *Biomaterials*, 28, 4512-4520.
- He, L. H., & Swain, M.V. (2007). Nanoindentation derived stress-strain properties of dental materials. *Dental Materials*, 23, 814-821.
- Huang, T.T.Y., Jones, A. S., He, L. H., Darendeliler, M. A., & Swain, M.V. (2007). Characterisation of enamel white spot lesions using X-ray micro-tomography. *Journal of Dentistry*, 35, 737-743.
- Ichim, I., Schmidlin, P.R., Li, Q., Kieser, J. A., & Swain, M.V. (2007). Restoration of non-carious cervical lesions: Part II. Restorative material selection to minimise fracture. *Dental Materials*, 23, 1562-1569.
- Ichim, I., Kieser, J. A., & Swain, M.V. (2007). Functional significance of strain distribution in the human mandible under masticatory load: Numerical predictions. *Archives of Oral Biology*, 52, 465-473.
- Ichim, I., Kieser, J. A., & Swain, M.V. (2007). Tongue contractions during speech may have led to the development of the bony geometry of the chin following the evolution of human language: A mechanobiological hypothesis for the development of the human chin. *Medical Hypotheses*, 69, 20-24.
- Ichim, I., Li, Q., Li, W., Swain, M.V., & Kieser, J. A. (2007). Modelling of fracture behaviour in biomaterials. *Biomaterials*, 28, 1317-1326.
- Ichim, I., Li, Q., Loughran, J., Swain, M.V., & Kieser, J. A. (2007). Restoration of non-carious cervical lesions: Part I. Modelling of restorative fracture. *Dental Materials*, 23, 1553-1561.
- Ichim, I., Schmidlin, P.R., Kieser, J. A., & Swain, M.V. (2007). Mechanical evaluation of cervical glass-ionomer restorations: 3D finite element study. *Journal of Dentistry*, 35, 28-35.
- Lin, D., Li, Q., Li, W., Ichim, I., & Swain, M.V. (2007). Damage evaluation of bone tissues with dental implants. *Key Engineering Materials*, 348-349, 905-908.

- Lin, J., Chandler, N. P., Purton, D. G., & Monteith, B. D. (2007). Appropriate electrode placement site for electric pulp testing first molar teeth. *Journal of Endodontics*, 33(11), 1296-1298.
- Lyons, K. M. (2007). *Partial dentures and crowns*. District Health Board New Zealand Oral Health Group. (pp. 1-24).
- Minguez, C.L., & Lyons, K. M. (2007). Failure of crowns and bridges: A review of the literature. *New Zealand Dental Journal*, 103(1), 7-13.
- Roy, R., & Chandler, N. P. (2007). Contemporary perspectives on root-end management during periapical surgery. *ENDO*, 1(2), 91-99.
- Roy, R., & Chandler, N. P. (2007). Tooth discoloration following dental trauma. *ENDO*, 1(3), 181-187.
- Schmidlin, P.R., Zehnder, M., Imfeld, T., & Swain, M.V. (2007). Comparative assessment of hardening of demineralized dentin under lining materials using an ultramicroindentation system. *Journal of Biomedical Materials Research Part B: Applied Biomaterials*, 83B, 199-205.
- Tholey, M. J., Waddell, J. N., & Swain, M.V. (2007). Influence of the bonder on the adhesion of porcelain to machined titanium as determined by the strain energy release rate. *Dental Materials*, 23, 822-828.
- Waddell, J. N., Ichim, I., Lee, H., Fangtao, L., Payne, A. G.T., & Swain, M.V. (2007). Fatigue failures of bar-attachment brazed joints for implant-supported overdentures. *Engineering Fracture Mechanics*, 74, 1148-1159.
- Wong, B. K. J., Leichter, J.W., Chandler, N. P., Cullinan, M. P., & Holborow, D.W. (2007). Radiographic study of ethnic variation in alveolar bone height among New Zealand dental students. *Journal of Periodontology*, 78(6), 1070-1074.
- Xie, Z. H., Mahoney, E. K., Kilpatrick, N. M., Swain, M.V., & Hoffman, M. (2007). On the structure-property relationship of sound and hypomineralized enamel. *Acta Biomaterialia*, 3, 865-872.

Conference Proceedings

- Cook, R., & Zioupos, P. (2007). The correlation of invasive vs. non-invasive assessments of properties of human bone. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2007/presentations.html>
- Ichim, I., Schmidlin, P.R., Li, Q., Kieser, J. A., & Swain, M.V. (2007). Restoration of non-carious cervical lesions: Restorative material selection to minimise fracture. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2007/presentations.html>
- Leichter, J.W., Chandler, N. P., Wong, B. K. J., Cullinan, M. P., & Holborow, D.W. (2007). Radiographic study of ethnic variation in alveolar bone height among New Zealand dental students. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2007/presentations.html>
- Lin, J., Chandler, N. P., Purton, D. G., & Monteith, B. D. (2007). The optimum electrode placement site for electric pulp testing of first molar teeth. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2007/presentations.html>
- Monteith, B. D., Minguez, C. L., & Lyons, K. M. (2007). Altered jaw posture in apnoeics. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2007/presentations.html>
- Morris, J., Waddell, N., & Swain, M.V. (2007). To determine using strain gauges, the stress and strains developed in implant supported overdentures. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2007/presentations.html>
- Parmar, D., Hauman, C. H. J., Tompkins, G., Leichter, J.W., & Ichim, I. (2007). A novel technique to assess viability of bacteria in dentine. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2007/presentations.html>
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Poster Sessions

Chiang, C., Aarts, J. M., Swain, M.V., Bennani, V., & Polyzois, G. (2007, October). *Hardness and elastic modulus of two denture softliners*. Poster session presented at the New Zealand Institute of Dental Technologists Annual Conference, Auckland, New Zealand.

Verbal Presentations

Bennani, V. (2007, June). *Success in full mouth rehabilitation with fixed prosthetic*. Verbal presentation at the Centenary Clinical Excellence in Patient Care Symposium, Dunedin, New Zealand.

Bennani, V. (2007, October). *How to succeed in full mouth rehabilitation with prosthetic treatment?* Keynote speaker at the New Zealand Institute of Dental Technologists Annual Conference, Auckland, New Zealand.

Chandler, N. P., & Leichter, J. W. (2007, June). *An unusual diagnostic and treatment trap: Maxillary third molar dens invaginatus presenting as a periodontal infection*. Verbal presentation at the Centenary Clinical Excellence in Patient Care Symposium, Dunedin, New Zealand.

Egan, J. G. (2007, March). *An evaluation of removable prosthodontic services of dentists and denturists*. Verbal presentation at the 19th Biennial Conference of the Australian Dental Prosthetists Association, Melbourne, Australia.

Egan, J. G. (2007, October). *Part 1: Reproducing centric jaw relation in the edentulous patient: A historical and contemporary review. Part 2: Occlusal vertical dimensional changes*. Verbal presentation at the New Zealand Institute of Dental Technologists Annual Conference, Auckland, New Zealand.

Lyons, K. M. (2007, June). *The role of the prosthodontist in maxillofacial rehabilitation*. Keynote speaker at the Centenary Clinical Excellence in Patient Care Symposium, Dunedin, New Zealand.

ORAL SCIENCES

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Ford, P. J., Gemmell, E., Timms, P., Chan, A., Preston, F. M., & Seymour, G. J. (2007). Anti-*P. gingivalis* response correlates with atherosclerosis. *Journal of Dental Research, 86*(1), 35-40.

Ford, P. J., Yamazaki, K., & Seymour, G. J. (2007). Cardiovascular and oral disease interactions: What is the evidence? *Primary Dental Care, 14*(2), 59-66.

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Poster Sessions

- Holmes, A. R., Lin, Y.-H., Niimi, K., Lamping, E., Monk, B., Kenya, M., & Cannon, R. D. (2007, May). *Differential expression and activities of drug efflux proteins Cdr1p and Cdr2p in azole resistant Candida albicans isolates*. Poster session presented at the Second Federation of European Biochemical Societies Advanced Lecture Course, La Colle sur Loup, France.
- Keniya, M.V., Holmes, A. R., Cannon, R. D., & Monk, B. C. (2007, November). *Heterologous expression of the Candida albicans plasma membrane proton pump in Saccharomyces cerevisiae*. Poster session presented at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.
- Monk, B. C., Keng, R., & Niimi, K. (2007, November). *An antifungal inhibitor of the yeast plasma membrane proton pump*. Poster session presented at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.
- Tanabe, K., Tomiyama, S., Lamping, E., Takano, Y., Uehara, Y., & Niimi, M. (2007, May). *Novel mutations in a Saccharomyces cerevisiae ABC protein, Pdr5p, result in insensitivity to the efflux pump inhibitor FK506*. Poster session presented at the Second Federation of European Biochemical Societies Advanced Lecture Course, La Colle sur Loup, France.
- Tyndall, J. D. A., McCormick, S., & Monk, B. C. (2007, February). *The ABC of mapping sequence to structure via homology modelling: A tale of two transporters*. Poster session presented at the Proteins: Structure, Function and Assembly in Health and Disease, Rotorua, New Zealand.

Verbal Presentations

- Bakri, M., Holmes, A. R., Cannon, R. D., & Rich, A. M. (2007, November). *The Acetaldehyde Dehydrogenase (ADH) genes of Candida albicans*. Verbal presentation at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.
- Cannon, R. D., Holmes, A. R., Lamping, E., Keniya, M.V., Niimi, K., & Monk, B. C. (2007, November). *Overcoming Candida albicans drug resistance*. Verbal presentation at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.
- Chandler, N. P., & Leichter, J.W. (2007, June). *An unusual diagnostic and treatment trap: Maxillary third molar dens invaginatus presenting as a periodontal infection*. Verbal presentation at the Centenary Clinical Excellence in Patient Care Symposium, Dunedin, New Zealand.
- Heng, N. C. K., Hale, J. D. F., Power, D. A., Inglis, M. A., & Tagg, J. R. (2007, November). *Sanguinicin K11, a novel antimicrobial peptide produced by the oral bacterium Streptococcus sanguinis*. Verbal presentation at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.
- Heng, N. C. K., Wirawan, R., Ritika, R., Power, D., Inglis, M., Jack, R.W., & Tagg, J. R. (2007, November). *Molecular characterisation of natural nisin U (lantibiotic) variants produced by several streptococcal species*. Verbal presentation at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.
- Meikle, M. C. (2007, September). *A century of progress: Advances in orthodontics since the foundation of the British Society for the Study of Orthodontics [Northcroft Memorial Lecture]*. Guest lecturer at the British Orthodontic Conference, Harrogate, UK.
- Monk, B. C. (2007, April). *Yeast and membrane proteins in drug discovery*. Verbal presentation at the Webster Centre for Molecular Research in Infectious Diseases Symposium, Dunedin, New Zealand.
- Niimi, K. (2007, April). *Echinocandin resistance mechanisms in Candida species*. Verbal presentation at the Webster Centre for Molecular Research in Infectious Diseases Symposium, Dunedin, New Zealand.
- Rodrigues, E., Upritchard, J. E., Yang, D., Holmes, A. R., Schmid, J., Perlin, D. S., & Cannon, R. D. (2007, November). *A new model for oral colonisation by Candida albicans*. Verbal presentation at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.

Swe, P.M., Ting, Y.T., Baird, H. J., Han, J., Carne, A., Tagg, J. R., Heng, N. C. K., & Jack, R.W. (2007, November). *New scaffolds and novel targets for anti-infectives against pathogenic streptococci and vancomycin-resistant enterococci*. Verbal presentation at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.

Weerasekera, M. M., Wong, L., Anderson, S., Holmes, A. R., Cannon, R. D., & Sissons, C. H. (2007, November). *Analysis of yeast species present in saliva by PCR-DGGE*. Verbal presentation at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.

ORAL DIAGNOSTIC & SURGICAL SCIENCES

Refereed Papers

Ackerman, J. L., Ackerman, M. B., & Kean, M. R. (2007). A Philadelphia fable: How ideal occlusion became the philosopher's stone of orthodontics [Guest editorial]. *International Journal of Periodontics and Restorative Dentistry*, 27(5), 409-410.

Ackerman, J. L., Proffit, W. R., Sarver, D. M., Ackerman, M. B., & Kean, M. R. (2007). Pitch, roll, and yaw: Describing the spatial orientation of dentofacial traits. *American Journal of Orthodontics and Dentofacial Orthopedics*, 131(3), 305-310.

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Kaur, J., Kay, K. D., Macdonald, H., & Rich, A. M. (2007). Use of hyperbaric oxygen therapy to prevent osteoradionecrosis. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2007/presentations.html>

Verbal Presentations

Bakri, M., Holmes, A. R., Cannon, R. D., & Rich, A. M. (2007, November). *The Acetaldehyde Dehydrogenase (ADH) genes of Candida albicans*. Verbal presentation at the Joint New Zealand Microbiology Society and New Zealand Society for Biochemistry and Molecular Biology Annual Conference, Wellington, New Zealand.

Hobson, R., Rolland, S., Rotgans, J., Schoonheim-Klein, M., Best, H., Chomyszyn-Gajewska, M., Dymock, D., Essop, R., Hupp, J., Kundzina, R., Love, R. M., et al. (2007, September). *Quality assurance, benchmarking, assessment and mutual international recognition of qualifications*. Verbal presentation at the Global Congress on Dental Education III, Dublin, Ireland.

2008 PUBLICATIONS

ORAL REHABILITATION

Books

Bogen, G., & Chandler, N. P. (2008). Vital pulp therapy. In J. I. Ingle, L. K. Bakland, & J. C. Baumgartner (Eds.), *Ingle's endodontics* (6th ed.). (pp. 1310-1329). Hamilton, Canada: BC Decker.

Kieser, J. A., Whittle, K., Wong, B. K. J., Waddell, J. N., Ichim, I., Swain, M. V., Taylor, M., & Nicholson, H. (2008). Understanding craniofacial blunt force injury: A biomechanical perspective. In M. Tsokos (Ed.), *Forensic pathology reviews* (Vol. 5) (pp. 39-51). Totowa, NJ, USA: Humana Press.

Refereed Papers

Aarts, J. M., Payne, A. G. T., & Thomson, W. M. (2008). Patients' evaluation of two occlusal schemes for implant overdentures. *Clinical Implant Dentistry and Related Research*, 10(3), 140-156.

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- He, L. H., & Swain, M.V. (2008). Understanding the mechanical behaviour of human enamel from its structural and compositional characteristics. *Journal of the Mechanical Behavior of Biomedical Materials*, 1, 18-29.
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Foster Page, L. A., Thomson, W. M., Jokovic, A., & Locker, D. (2008). Evaluation of short-form versions of the Child Perception Questionnaire. *Proceedings of the International Association for Dental Research 86th General Session and Exhibition*. IADR. Retrieved from http://iadr.confex.com/iadr/2008Toronto/techprogram/abstract_104811.htm

Kennedy, D., Kieser, J. A., Swain, M. V., & Waddell, J. N. (2008). Measuring intraoral pressure: Real time analysis of swallowing patterns with miniature pressure transducers. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2008/presentations.html>

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Quick, A. N., Kum, M., Rose, D., Lim, Y., Swain, M. V., Herbison, P., & Hood, J. (2008). A review of the characteristics of nickel-titanium (ni-ti) orthodontic closing loops: Pushing new frontiers. *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2008/presentations.html>

Poster Sessions

Abduo, J., Bennani, V., Waddell, N., Lyons, K. M., & Swain, M. V. (2008, October). *Fit of Implant Fixed Partial Denture: A Preliminary Study*. Poster session presented at the 48th Annual Meeting of the Australia-New Zealand Division of the International Association for Dental Research, Perth, Western Australia.

Radford, G., Kieser, J. A., Bernal, V., Waddell, J. N., & Forrest, A. (2008, October). *Biomechanical aspects of human bitemark reconstruction*. Poster session presented at the 19th International Symposium on the Forensic Sciences, Melbourne, Australia.

Tiong, R., Adams, C., Haw, S., Wu, W., Ou Yang, Y. F., Lee, R., Kuo, J., Swain, M. V., Waddell, J. N., Aarts, J. M., & Bennani, V. (2008, October). *Failure mechanisms of porcelain fused to metal (PFM) crowns*. Poster session presented at the New Zealand Institute of Dental Technologists Annual Conference, Christchurch, New Zealand.

Verbal Presentations

Alsabeeha, N., Payne, A. G. T., & De Silva, R. K. (2008, June). *Rehabilitation of an edentulous older adult using a mandibular single implant overdenture opposing a complete maxillary denture*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.

Bennani, V. (2008, May). *Oral rehabilitation using fixed prosthodontics I*. Verbal presentation at the New Zealand Association of Prosthodontics and Restorative Dentists Annual Meeting, Wellington, New Zealand.

Bennani, V. (2008, May). *Oral rehabilitation using fixed prosthodontics II*. Verbal presentation at the New Zealand Association of Prosthodontics and Restorative Dentists Annual Meeting, Wellington, New Zealand.

Brown, S., Becconsall, K., De Silva, R., & Payne, A. G. T. (2008, June). *Immediate restoration of an innovative implant design, placed in a fresh extraction socket, with an all-ceramic crown*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.

- Chandler, N. P. (2008, November). *Endodontic illusions*. Verbal presentation at the Inaugural Trans-Tasman Endodontic Conference, Hobart, Tasmania.
- Chandler, N. P., Campbell, D., & Monteith, B. D. (2008, October). *Depth of root-end cavities prepared by endodontists*. Verbal presentation at the 48th Annual Meeting of the Australia-New Zealand Division of the International Association for Dental Research, Perth, Western Australia.
- Desai, S. (2008, June). *An apex revisited*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.
- Egan, J. G., Pearce, P., & Payne, A. G. T. (2008, June). *Trouble-shooting for clinical dental technicians treating implant overdenture patients*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.
- Foster Page, L. A. (2008, June). *Dental treatment for children with Early Childhood Caries (ECC) in Taranaki*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.
- Kennedy, D., Kieser, J. A., Swain, M.V., Bolter, C., Singh, B., & Waddell, J. N. (2008, June). *Patterns of pressure change during saliva swallowing*. Verbal presentation at the 2nd Annual Biomouth Symposium, Rotorua, New Zealand.
- Kieser, J. A., Radford, G., Bernal, V., Waddell, J. N., & Forrest, A. (2008, August). *Biomechanical approach to human bitemark reconstruction*. Verbal presentation at the 14th International Symposium on Dental Morphology, Greifswald, Germany.
- Ma, S., Soo, L. F., Verma, R., Payne, A. G. T., & Duncan, W. J. (2008, June). *A comparison of the functional and aesthetic requirements for two maxillary fixed implant bridge patients*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.
- Payne, A. G. T. (2008, June). *Clinical cases showing the challenges of rehabilitating edentulous or nearly edentulous patients*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.
- Swain, M.V. (2008, May). *Zirconia chipping and long-term stability of all ceramic crowns and bridges 1: Scientific basis*. Verbal presentation at the New Zealand Association of Prosthodontics and Restorative Dentists Annual Meeting, Wellington, New Zealand.
- Swain, M.V. (2008, May). *Zirconia chipping and long-term stability of all ceramic crowns and bridges 2: Technology considerations*. Verbal presentation at the New Zealand Association of Prosthodontics and Restorative Dentists Annual Meeting, Wellington, New Zealand.
- Tiong, R., Adams, C., Haw, S., Wu, W., Ou Yang, Y. F., Lee, R., Kuo, J., Swain, M.V., Waddell, J. N., Aarts, J. M., & Bennani, V. (2008, October). *Understanding the way PFM crowns crack [NZIDT top student research presentation award]*. Verbal presentation at the New Zealand Institute of Dental Technologists Annual Conference, Christchurch, New Zealand.
- Waddell, N. (2008, October). *Cement retain versus screw retain implant restorations in the mandible*. Verbal presentation at the New Zealand Institute of Dental Technologists Annual Conference, Christchurch, New Zealand.
- Waddell, N. (2008, October). *"The new frontier": Current trends in dental technology*. Verbal presentation at the New Zealand Institute of Dental Technologists Annual Conference, Christchurch, New Zealand.
- Waddell, N., & Choi, Y. J. (2008, October). *Effects of cooling rates on residual stress in veneering porcelains: Implications for Zirconia crowns*. Verbal presentation at the New Zealand Institute of Dental Technologists Annual Conference, Christchurch, New Zealand.

ORAL SCIENCES

Books

- Kieser, J. A., Whittle, K., Wong, B. K. J., Waddell, J. N., Ichim, I., Swain, M.V., Taylor, M., & Nicholson, H. (2008). Understanding craniofacial blunt force injury: A biomechanical perspective. In M. Tsokos (Ed.), *Forensic pathology reviews (Vol. 5)* (pp. 39-51). Totowa, NJ, USA: Humana Press.

Refereed Papers

- Aarts, J. M., Payne, A. G. T., & Thomson, W. M. (2008). Patients' evaluation of two occlusal schemes for implant overdentures. *Clinical Implant Dentistry and Related Research*, 10(3), 140-156.
- Antoun, J. S., Adsett, L. A., Goldsmith, S. M., & Thomson, W. M. (2008). The oral health of older people: General dental practitioners' beliefs and treatment experience. *Special Care in Dentistry*, 28(1), 2-7.
- Atieh, M. A. (2008). Accuracy of real-time polymerase chain reaction versus anaerobic culture in detection of *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis*: A meta-analysis. *Journal of Periodontology*, 79(9), 1620-1629.
- Ayers, K. M. S., Thomson, W. M., Al-Hassiny, H., & Newton, J. T. (2008). A qualitative investigation of the experiences of immigrant dentists working in New Zealand. *New Zealand Dental Journal*, 104(3), 97-103.
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- Ayers, K. M. S., Thomson, W. M., Rich, A. M., & Newton, J. T. (2008). Gender differences in dentists' working practices and job satisfaction. *Journal of Dentistry*, 36(5), 343-350.
- Ayers, K. M. S., Thomson, W. M., Whyman, R. A., Rich, A. M., & Newton, J. T. (2008). Changes in the New Zealand dentist workforce over a nine-year period. *New Zealand Dental Journal*, 104(1), 19-26.
- Broadbent, J. M., Thomson, W. M., & Poulton, R. (2008). Trajectory patterns of dental caries experience in the permanent dentition to the fourth decade of life. *Journal of Dental Research*, 87(1), 69-72.
- Cullinan, M. P., Westerman, B., Hamlet, S. M., Palmer, J. E., Faddy, M. J., Seymour, G. J., Middleton, P. G., & Taylor, J. J. (2008). Progression of periodontal disease and interleukin-10 gene polymorphism. *Journal of Periodontal Research*, 43(3), 328-333.
- Deng, D., Lauren, D. R., Cooney, J. M., Jensen, D. J., Wurms, K. V., Upritchard, J. E., Cannon, R. D., Wang, M. Z., & Li, M. Z. (2008). Antifungal saponins from *Paris polyphylla* Smith. *Planta Medica*, 74(11), 1397-1402.
- Egan, J. G., Payne, A. G. T., & Thomson, W. M. (2008). Removable prosthodontic services, including implant-supported overdentures, provided by dentists and denturists. *Journal of Oral Rehabilitation*, 35(4), 252-258.
- Farah, R. A., Drummond, B. K., Swain, M. V., & Williams, S. M. (2008). Relationship between laser fluorescence and enamel hypomineralisation. *Journal of Dentistry*, 36(11), 915-921.
- Forbes, K., Thomson, W. M., Kunzel, C., Lalla, E., & Lamster, I. B. (2008). Management of patients with diabetes by general dentists in New Zealand. *Journal of Periodontology*, 79(8), 1401-1408.
- Ford, P. J., Seymour, G. J., Beeley, J. A., Curro, F., DePaola, D., Ferguson, D., et al. (2008). Adapting to changes in molecular biosciences and technologies. *European Journal of Dental Education*, 12(Suppl. 1), (pp. 40-47).
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- Kieser, J. A., Bernal, V., Gonzalez, P., Birch, W., Turmaine, M., & Ichim, I. (2008). Analysis of experimental cranial skin wounding from screwdriver trauma. *International Journal of Legal Medicine*, 122(3), 179-187.
- Kieser, J. A., de Feijter, J., & TeMoananui, R. (2008). Automated dental aging for child victims of disasters. *American Journal of Disaster Medicine*, 3(2), 109-112.

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- Lawrence, H. P., Thomson, W. M., Broadbent, J. M., & Poulton, R. (2008). Oral health-related quality of life in a birth cohort of 32-year olds. *Community Dentistry and Oral Epidemiology, 36*(4), 305-316.
- Lawton, B., Rose, S., Kieser, J., Broadbent, J. M. J., Sussex, P., Thomson, W. M., & Dowell, A. (2008). Disparities in edentulism and tooth loss between Māori and non-Māori New Zealand women. *Australian and New Zealand Journal of Public Health, 32*(3), 254-260.
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- Meikle, M. C. (2008). Northcroft Memorial Lecture 2007. A century of progress: Advances in orthodontics since the foundation of the British Society for the Study of Orthodontics. *Journal of Orthodontics, 35*(3), 176-190.
- Mladenovski, A., & Kieser, J. A. (2008). The efficacy of multimedia pre-operative information for patients: A pilot study. *New Zealand Dental Journal, 104*(2), 36-43.
- Monk, B. C., & Goffeau, A. (2008). Outwitting multidrug resistance to antifungals. *Science, 321* (5887), 367-369.
- Nash, D. A., Friedman, J. W., Kardos, T. B., Kardos, R. L., Schwarz, E., Satur, J., Berg, D. G., Nasruddin, J., Mumghamba, E. G., Davenport, E. S., & Nagel, R. (2008). Dental therapists: A global perspective. *International Dental Journal, 58*(2), 61-70.
- Odgers, C. L., Moffitt, T. E., Broadbent, J. M., Dickson, N., Hancox, R. J., Harrington, H., Poulton, R., Sears, M. R., Thomson, W. M., & Caspi, A. (2008). Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology, 20*(2), 673-716.
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Radford, G., Kieser, J. A., Bernal, V., Waddell, J. N., & Forrest, A. (2008, October). *Biomechanical aspects of human bitemark reconstruction*. Poster session presented at the 19th International Symposium on the Forensic Sciences, Melbourne, Australia.

Verbal Presentations

Cullinan, M.P. (2008, April). *Risk factors for periodontal disease*. Keynote address at the Faculty of Dentistry 3M Research Day, Dunedin, New Zealand.

Grevér, A.-C. (2008, June). *Oral motor therapy: A Swedish perspective*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.

- Harding, W. (2008, September). *The Health Practitioners Competency [sic] Assurance Act and orthodontic auxiliaries: The first five years*. Verbal presentation at the Biennial New Zealand Association of Orthodontists Conference, Nelson, New Zealand.
- Healey, D. (2008, September). *Expansion: So that's what all the fuss is about*. Verbal presentation at the Biennial New Zealand Association of Orthodontists Conference, Nelson, New Zealand.
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- Kennedy, D., Kieser, J. A., Swain, M. V., Bolter, C., Singh, B., & Waddell, J. N. (2008, June). *Patterns of pressure change during saliva swallowing*. Verbal presentation at the 2nd Annual Biomouth Symposium, Rotorua, New Zealand.
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- Quick, A. N. (2008, September). *Class 2 mechanics*. Verbal presentation at the Biennial New Zealand Association of Orthodontists Conference, Nelson, New Zealand.
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- Rodrigues, E. (2008, April). *Microbiol and functional analyses of failed visco prostheses*. Verbal presentation at the Dunedin School of Medicine Research Day, Dunedin, New Zealand.
- Thomson, W. M. (2008, October). *Evidence into action: Which evidence, which action?* Keynote address at the 48th Annual Meeting of the Australia-New Zealand Division of the International Association for Dental Research, Perth, Western Australia.
- Thomson, W. M. (2008, June). *Oral health and socio-economic status*. Verbal presentation at the Findings from the Dunedin Longitudinal Study Dissemination Hui, Dunedin, New Zealand.
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Love, R.M. (2008). Global harmonization of dental education: Is it possible? *Proceedings of the Faculty of Dentistry 3M Research Day*. Retrieved from <http://dentistry.otago.ac.nz/research/rd2008/presentations.html>

Poster Sessions

Bakri, M., Horne, L., Fisher, M., Holmes, A. R., Cannon, R. D., & Rich, A. M. (2008, October). *Role of Candida albicans in pre-cancerous oral lesions*. Poster session presented at the 48th Annual Meeting of the Australia-New Zealand Division of the International Association for Dental Research, Perth, Western Australia.

Verbal Presentations

Alsabeeha, N., Payne, A. G.T., & De Silva, R. K. (2008, June). *Rehabilitation of an edentulous older adult using a mandibular single implant overdenture opposing a complete maxillary denture*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.

Becconsall, K., De Silva, H., & De Silva, R. K. (2008, June). *Rugby: A contact sport*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.

Brown, S., Becconsall, K., De Silva, R. K., & Payne, A. G.T. (2008, June). *Immediate restoration of an innovative implant design, placed in a fresh extraction socket, with an all-ceramic crown*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.

Buchanan, J., & De Silva, R. K. (2008, June). *Temporomandibular joint replacement*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.

Hussaini, H. M., Sinon, S. H., Horne, L. S., Firth, N. A., & Rich, A. M. (2008, June). *Peripheral ameloblastoma: Case report, clinico-pathological review and immunohistological study*. Verbal presentation at the Clinical Excellence Symposium of Patient Care, Dunedin, New Zealand.

Kuzmanovic, D. (2008, May). *Current research*. Verbal presentation at the New Zealand Association of Prosthodontics and Restorative Dentists Annual Meeting, Wellington, New Zealand.

Love, R. M. (2008, September). *Guidelines for surgical endodontics*. Invited speaker at the FDI Annual World Dental Congress, Stockholm, Sweden.

Love, R. M. (2008, September). *Overcoming root canal obstacles*. Invited speaker at the FDI Annual World Dental Congress, Stockholm, Sweden.

Tong, D. C. (2008, October). *War injuries of the face and jaws*. Verbal presentation at the New Zealand Institute of Dental Technologists Annual Conference, Christchurch, New Zealand.

Others

Broughton, J. R. (2008). (lyricist) *Showband Aotearoa: The Musical*, Music by Rim D. Paul.

Summer Studentships

STUDENT	COURSE	TITLE OF RESEARCH PROJECT 2006-2007	SUPERVISOR	AWARD
Lillian Hsu	BDS	Bacterial DNA comparison of human bite marks and teeth by non-culturing molecular methods	Dr G Tompkins	R C Tonkin
Jasmeen Kaur	BDS	Retrospective audit of the outcomes of the Marx Proto for prophylactic hyperbaric oxygen therapy in management of people requiring dental extractions following radiotherapy to head and neck	Associate Professor A Rich D Hay H MacDonald	Auckland Dental Association
Rita Keng	BDS	Discovery of inhibitors of the fungal plasma membrane proton pump	Dr K Niimi Dr BC Monk	Health Research Council
Joshua Koh	BDS	Mode of action of novel antifungal	Dr BC Monk	Oral Theme
Rebeka Friedlander	BDS	Molecular microbiological analysis of bite marks	Dr G Tompkins Mr J Horswell	Oral Theme
Yeen Lim	BDS	Effect of temperature changes on Japanese NiTi and TMA closing loops	Mr A Quick	Otago Branch NZDA
Amy Marshal	BOH	An investigation of the health promotion and health education practices of New Zealand registered dental therapists and dental hygienists	Mrs A Meldrum Ms K Morgaine	Colgate
Shilpa Raju	BDS	<i>Candida albicans</i> plasma membrane efflux pumps: functional analysis and micro-evolution	Dr A Holmes Professor R Cannon	NZDRFB
Jessica Rothnie	BDS	Cross-reactive antibody responses to heat shock proteins in atherosclerosis and periodontal disease	Dr P Ford	NZ Periodontology Society
Chamil Samaranayaka	BDS	Reconstitution of a thermophile DNA gyrase for structural studies and drug discovery.	Dr BC Monk	Sir John Walsh Research Institute
STUDENT	COURSE	TITLE OF RESEARCH PROJECT 2007-2008	SUPERVISOR	AWARD
Tatiana Tkatchenko	BDS	Biochemics of dog-bites	Professor J Kieser Professor M Swain Mr I Ichim	Faculty of Dentistry
Yeen Lim,	BDS	Dynamics of mastication in humans	Professor J Kieser Professor M Swain Mr J Waddell Mr I Ichim	Otago Branch NZDA
Cara Young,	BDS	Improving the growth yield of the model yeast <i>Saccaromyces cerevisiae</i>	Dr A Holmes Dr BC Monk	Auckland Dental Association
Sulwyn Reed,	BDS 3	Mechanisms of candidin resistance in <i>Candida glabrata</i> – disruption of $\beta(1,3)$ -glucan synthase catalytic subunits FKSG and/or FKSK	Dr K Niimi Dr BC Monk	Division of Health Sciences

Dale Benic	BDS 4	Effect of endodontic access cavities on the structural integrity of all-ceramic discs	Professor M Swain Professor R Love Mr D Kuzmanovic	RC Tonkin
Nathalie Uwamahoro	Molec. Biotechnol. Appl/Sc (Hons)	Cloning of the drug target <i>Candida albicans</i> topoisomerase II in <i>Saccharomyces cerevisiae</i>	Dr B C Monk Dr M Keniya	Sir John Walsh Research Institute
Lye K Ng	BDS 3	Expression of toll-like receptors in OSCC	Associate Professor A Rich	Division of Health Sciences
Jessica Schionning	BDS 4	A comparison of the subgingival microbiota following laser and conventional mechanical debridement	Associate Professor M Cullinan Dr N Heng Mr J Leichter	NZ Society of Periodontology
Lillian Hsu	BDS	Sequence comparison of Streptococcal ribosomal DNA amplified from human bite marks and teeth	Dr G Tompkins J-A Skinner Professor J Kieser	Faculty of Dentistry



Invited Presentations

PROFESSOR RICHARD CANNON

School of Biological Sciences, University of Auckland, Auckland, 14 March 2008.

“Oral fungi: saliva-mediated adherence and drug resistance”

Department of Biochemistry, University of Otago, Dunedin, 6 May 2008.

“A tale of two projects: Crystallising the *Candida albicans* azole drug target and a new animal model of oral colonisation”

Institute of Molecular Biosciences, Massey University, Palmerston North, 16 July 2008.

“Efflux pump-mediated drug resistance of *Candida albicans*”

Astellas Pharma Inc, Tokyo, Japan, 9 January 2007.

“University of Otago: a provider of advanced technology for drug discovery, validation and development”

Teikyo University Institute of Medical Mycology, Tokyo, Japan, 10 January 2007.

“Overcoming the antifungal drug resistance of *Candida albicans*”

Chiba University, Chiba, Japan, 12 January 2007.

“Allelic variation in *Candida albicans* drug efflux pumps”

General Research Institute, Nippon Dental University, Niigata, Japan, 15 January 2007.

“Research, Teaching, and Clinical Services at the University of Otago School of Dentistry: Changes in Direction”

University of California at San Francisco (UCSF) Dental School, USA, 20 March 2007.

“Saliva-mediated adherence of *Candida albicans*”

85th General Session of the International Association for Dental Research (IADR), New Orleans, USA, 22 March 2007.

“Overcoming efflux pump-mediated drug resistance in *Candida albicans*”

Department of Biochemistry & Biophysics, UCSF, USA, 27 March 2007.

“Functional and structural analysis of fungal ABC drug efflux pumps”

Seattle Biomedical Research Institute and University of Washington, Seattle, Washington, USA, 7 June 2007.

“Overcoming the efflux-mediated resistance of *Candida albicans*”

University of Minnesota School of Dentistry, Minneapolis, USA, 1 August 2007.

“Oral colonisation by *Candida albicans* and fungal drug resistance”

Department of Microbiology, Columbia University, New York, USA, 25 September 2007.

“Efflux pump-mediated drug resistance of *Candida albicans*”

Merck Research Laboratories, Rahway, New Jersey, USA, 16 October 2007.

“Drug efflux pumps in *Candida albicans* and a new animal model for oral colonization”

Public Health Research Institute, University of Medicine and Dentistry of New Jersey, Newark, New Jersey, USA, 24 October 2007.

“Saliva-mediated adherence of *Candida albicans* and a new rat model of oral colonisation”

MARY CULLINAN

Pacific Basin Dental Association, Hawaii, USA, 26 January 2007.

“Oral health-diabetes interrelationship: the contribution of the dentist to prevention and management strategies.”

College of Dentistry, University of Nebraska, Lincoln, Nebraska USA, 4 March 2008.

“Environmental and genetic risk factors and the progression of periodontal disease.”

Faculty of Dentistry, Research Day, Dunedin, 10 April 2008.

“Risk factors for periodontal disease.”

New Zealand Dental Association, Otago Branch, Dunedin, 19 May 2008.

“The oral health-systemic health connection from a health behaviour perspective.”

New Zealand Dental Association Biennial Conference, Rotorua, 11 September 2008.

“Understanding risk for periodontal disease.”

PROFESSOR JULES KIESER

NZ Dental Association, Taranaki, Branch, 28-29 February 2008.

"Clinical Anatomy Update".

New Zealand Dental Association, Auckland, Tauranga, Nelson & Wellington, March 2007.

"Clinical Anatomy Course".

DR ERWIN LAMPING

Second International Symposium on Advanced Biological Engineering and Science, Tsinghua University, Beijing, China, March 2008.

"Yeast ? a promising host for the study of eukaryotic membrane proteins".

Concordia University Chemistry and Biochemistry Dept., Montreal, Canada, December 2007.

"Development of a eukaryotic membrane protein expression system in *Saccharomyces cerevisiae*".

University of Otago Dental Research Day, Dunedin, New Zealand, March 2007.

"Mechanisms of innate azole resistance in *Candida krusei*".

PROFESSOR ROBERT LOVE

FDI Congress, Stockholm, 23-27th September 2008.

"Guidelines for surgical endodontics."

FDI Congress, Stockholm, 23-27th September 2008.

"Overcoming root canal obstacles."

DentEd Global Congress, Dublin, 6-8 September 2007.

"Working Group 7 Dental Education: Quality Assurance, Benchmarking, Assessment of Learning and Mutual International Recognition of Qualifications."

Arizona Endodontic Association, 23 June 2007.

"Colonisation and disinfection of radicular dentine."

University of Southern California, School of Dentistry, 25 June 2007.

"Colonisation and disinfection of radicular dentine."

New Zealand Dental Association 2007 Regional Conference, Dunedin, 26 August 2007.

"The inside story" "What you always wanted to know about endo but couldn't quite see clearly!"

University of Otago, Faculty of Dentistry, Centennial Conference, Scientific Symposium, 3rd June 2007.

"Dental and Maxillofacial Skeletal Injuries seen at the University of Otago School of Dentistry, New Zealand, 2000-2004."

DR BRIAN MONK

Visiting Scientist, Instituto Superior Tecnico (IST), Lisbon, 1 October 2008 – 31 January 2009. Supported by Portuguese Foundation for Science and Technology (FCT) fellowship.

"Multidrug resistance" and "Multidrug resistance in pathogenic fungi."

French-Belgian meeting on ABC transporters, Paris, 15 October 2008.

"Multidrug resistance in pathogenic fungi."

University of Otago Health Sciences Annual Research Forum, Dunedin, 12 September 2007.

"Heterologous hyper-expression of functional membrane proteins in *Saccharomyces cerevisiae*: New avenues to drug discovery."

ANDREW QUICK

NZDHA conference, 17 June 2007.

"White spot lesions during orthodontic treatment."

NZDTA Symposium, 25 May 2007.

"A lifetime of teeth."

ASO biennial conference, 2 May 2008.

"Effect of temperature on the moments and forces of NiTi and TMA symmetrical T-loops."

NZAO Conference, 5 September 2008.

"Out damn'd spot – initiatives to combat enamel demineralisation during orthodontic treatment".

ALISON RICH

Annual meeting of the Royal College of Pathologists, Sydney, March 2008.

"Unicystic ameloblastomas: experience in an oral pathology diagnostic service 2003-2007:"

Annual meeting of the New Zealand Dental Association, Dunedin, August 2007.

"An overview of Biopsy Procedures:"

Dental School Centenary meeting, Dunedin, June 2007.

"How will this lesion behave; an update on potentially malignant lesions:"

PROFESSOR GREGORY SEYMOUR

Pacific Basin Dental Association, Hawaii, January 2007.

"The importance of adult oral health to general health:"

IADR General Session (symposium speaker), New Orleans, March 2007.

"The role of the immune response in defining risk for periodontal disease:"

European Congress of Clinical Microbiology and Infectious Disease, Munich April 2007.

"Relationship between periodontal infections and systemic disease – the oral systemic connection:"

Japanese Society for Periodontology 50th Anniversary Meeting, Tokyo, Japan, September 2007.

"Body, bugs and lifestyle: Susceptibility to periodontal disease:"

Niigata University, Niigata, Japan, September 2007.

"The role of the immune response in defining risk for periodontal disease:"

University of Nebraska, USA, March 2008.

"The relationship between periodontal disease and cardiovascular disease:"

Society for General Microbiology, UK, Dublin Ireland, September 2008.

"Infection or inflammation: The link between periodontal disease and cardiovascular disease:"

PROFESSOR GEOFFREY TOMPKINS

Auckland University of Technology International Conference on Oral Health, Auckland, April 2008. "The new Stage for Oral Health 2008":

"Comparison of oral bacteria from bite marks and teeth:"

PROFESSOR W MURRAY THOMSON

Northwestern/Alaska Center to Reduce Oral Health Disparities, University of Washington, Seattle, USA, 11 December 2008.

"Documenting the natural history of oral health and disease through the first three decades of life – some findings from the Dunedin Study":

Australia-New Zealand Divisional Conference of the International Association for Dental Research, Perth, Australia,

1 October 2008.

"Evidence into action: which evidence, and which action?"

NZ Society for Hospital and Community Dentistry Conference, Auckland, 24 July 2008.

"Public health dentistry in NZ: academic and research aspects:"

Faculty of Dentistry, Research Day, 10 April 2008.

"The oral health of older people – preliminary outcomes from a feasibility study":

Great Dental Day Out, Canterbury Branch of the NZ Dental Association, 2 November 2007.

"Oral health and disease through life: what can we learn from the Dunedin Study?"

Symposium of the New Zealand Dental Hygienists' Association, 16 June 2007.

"Oral health and disease through life: what can we learn so far from the Dunedin Study?"

New Zealand Dental Therapy Symposium, Dunedin, 25 May 2007.

"Oral health in adolescence and beyond":

Universiti Malaya, Kuala Lumpur, Malaysia, 11 May 2007.

"The challenges facing oral health promotion: what does the epidemiological evidence tell us?" and "Identifying gaps in the practice and evaluation of oral health promotion"

Awards

Jonathan Broadbent	IADR Colgate Travel Award: Postgraduate research -IADR Barossa, South Australia, 2007 IADR Colgate Travel Award: Postgraduate research -IADR Toronto, 2007
Professor Richard Cannon	Finalist in the Science and Health Section of the Bayer Innovators' Awards, Hyatt, Auckland, 2008
Associate Professor Bernadette Drummond	Elected President Royal Australasian College of Dental Surgeons, 2008
Dr Mikhail Keniya	Awarded a visiting fellowship by the Japan Health Sciences Foundation in Laboratory of Mycology, Department of Bioactive Molecules, National Institute of Infectious Diseases, 2007
Professor Jules Kieser	Awarded the Alan Docking Award of the ANZ Division of the International Association for Dental Research, 2008
Professor Greg Seymour	Elected to Fellowship of the Royal Society of New Zealand in recognition of distinction in research and the advancement of science, 2008
Darryl Tong	Dental Annual Teaching Award for best lecturer in third year BDS undergraduate teaching, 2008. Dental Annual Teaching Award for best lecturer in BOH undergraduate Teaching, 2008. Fellowship of St Margaret's College, University of Otago, 2008
Ludwig Jansen van Vuuren	Awarded Educator of the year in Dental technology (2007 - 2008), by the Dental Technology Association of South Africa.



Sponsors

The following is a list of donors who provided financial or in-kind support for research in the Faculty of Dentistry during 2007-2008. Their contributions are greatly appreciated by Faculty and students.

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Faculty of Dentistry 3M Research Day 2007



SUMMARY

Over 190 final year students, staff and practitioners attended the Faculty of Dentistry 3M Research Day held in the Glenroy Auditorium on 30 March 2007.

Dr Brian Monk opened proceedings at 9am. He introduced the guest speaker Professor Warren Tate to assembled Faculty staff, final year students, postgraduates, and visitors. Professor Tate is the current holder of the University of Otago Distinguished Research Medal.

Professor Tate delivered a stimulating keynote address entitled "*Serendipity in science – showing how a research area can develop strategically from a fundamental study and discovery*".

For the rest of Session I Professor Brian Monteith spoke on "*Altered jaw posture in apnoeics*".

At the tea-break in the Fullwood Room posters, including those of the IADR contestants, were on display. Steve Freeman, Deb Falker, Kelly Banks and Marie Warren representing our sponsors 3M Unitek and 3M Espe, had a table display.

The IADR Student Poster Competition judging commenced after tea break. The judges were Mr David Purton, Professor Warren Tate, Dr Geoff Tompkins and Mr Darryl Tong.

The joint winners of the Junior Poster Competition were Lillian Hsu and Chamil Samaranayake. The winner of the Senior Poster Competition was Jonathan Broadbent.

With support from Colgate and the New Zealand Section of the International Association Dental Research, the winners will attend the IADR Division Meeting in Adelaide in September.



JACK LIN TAKES THE BEST STUDENT ORAL PRESENTER PRIZE

Jack Lin took the prize for the best student presentation on the Faculty of Dentistry 3M Research Day. Jack won vouchers worth \$250 for his presentation entitled "*The optimum electrode placement site for electric pulp testing of the first molar teeth*".

Judges Associate Professor Nick Chandler, Mr Steve Freeman from 3M and Dr Martin Lee (Christchurch) said this presentation, in a very close competition, best met the criteria for the award.

Further Information is available on the website:

<http://dentistry.otago.ac.nz/research/rd2008/researchday2008.html>

Faculty of Dentistry 3M Research Day 2008

SUMMARY

The annual Faculty of Dentistry 3M Research Day was held at the University of Otago College of Education Auditorium on 10 April 2008.



MARINA BAKRI BEST STUDENT ORAL PRESENTER PRIZE

Marina won a \$250 book voucher for her presentation entitled "Role of Candida in pre-cancerous oral lesions" in front of over 160 final year students, staff and practitioners.

Judges Professor Jules Kieser, Dr Vincent Bennani and Mr Steve Freeman, from 3M, said this presentation, in a very close competition, best met the criteria for the award.

Marina is a final year PhD student studying with the Research Group on the third floor in the Molecular Microbiology Laboratory.

This Group is lead by Professor RD Cannon and the members are Dr A Holmes, Dr E Lamping, T Milne, Dr B Monk, Dr K Niimi, Dr G Tompkins, and J Upritchard.

KEYNOTE SPEAKERS



PROFESSOR W MURRAY THOMSON ORAL SCIENCES DEPARTMENT FACULTY OF DENTISTRY

Murray Thomson's epidemiological and clinical research efforts cover a wide range of oral conditions, problems and settings, most notably in the fields of gerodontology, dental caries and tooth loss, periodontal disease, dental anxiety and xerostomia. While longitudinal research is his favoured approach, he also conducts cross-sectional surveys, secondary analyses of routinely-collected data-sets, and a variety of health services research projects, including qualitative research.



ASSOCIATE PROFESSOR MARY CULLINAN ORAL SCIENCES DEPARTMENT FACULTY OF DENTISTRY

Mary Cullinan's research is predominantly clinical in the field of periodontal disease and she is currently working on several large multidisciplinary clinical studies. Her interests include microbiological, environmental and genetic risk factors for periodontal disease as well as the relationship between periodontal disease and systemic diseases such as cardiovascular disease and diabetes. She is also interested in the effect of interventions on health behaviour.

Further Information is available on the website:

<http://dentistry.otago.ac.nz/research/rd2008/researchday2008.html>

“MY FAVOURITE PLACE
IN THE WORLD...”



*... is in the molecular
microbiology lab
conducting forensic
based research.”*

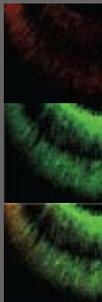


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