Advancing oral health through outstanding education, research, and community service.
Our eighth annual Research Day will have a very different format and context than the previous seven Research Days. The 2015 year is the 51st for UBC Dentistry and just like in the first year of the Faculty of Dentistry, a major initiative is the creation of a new DMD curriculum. Just as occurred in the 1960s, a small group of faculty members have dedicated themselves to organizing a new curriculum that will take the Faculty into the next 50 years.

The changes in the DMD curriculum are based on very solid research in education so that the program is optimal for all of our students. We are fortunate that faculty members who participated in the development of the original DMD curriculum will be able to provide their reflections on the priorities that existed in the 1960s. We can compare those original curricular goals with our current goals and see both similarities and differences. One major goal of the present curricular revision was to integrate and coordinate educational activities in multiple programs in Dentistry and with other Faculties at UBC. Interprofessional education (IPE) and practice (IPP) have been recognized as major contributors to improved patient outcomes and both are embedded in the new DMD curriculum.

We are delighted to have a diverse group of speakers. They will provide a historical reference to the original DMD curriculum, the process to develop a new DMD curriculum, the linkages to other health professions integrated into the revised educational program, the value of interprofessional and community experiences in the learning environment, and the educational theory and research that support the structure of the new curriculum. The variety of presentations should create a program that provides information at many levels of value to the diverse population of individuals that constitute UBC Dentistry.

Enjoy the day learning about the DMD curriculum revision that is occurring and affecting all of our educational programs. This new curriculum and the linkages to other programs in Dentistry and across UBC will begin in Autumn 2015. The success of the new curriculum is dependent upon everyone in the Faculty of Dentistry and so it is important to be as knowledgeable as possible about the coming changes. 2015 is the start of the next half century of the UBC Faculty of Dentistry. It is time to build on the remarkable foundation that was established in the first 50 years.

Thank you for your participation.

Charles F. Shuler, DMD, PhD
Professor and Dean, UBC Faculty of Dentistry
The 2015–2016 academic year will begin with the implementation of a renewed DMD program!

Since 1997, the UBC Faculty of Dentistry has collaborated with the UBC Faculty of Medicine to incorporate a hybrid problem-based learning biomedical sciences curriculum in the first two years of their respective MD and DMD program curricula. The MD undergraduate program is instituting a major curriculum renewal designed specifically to meet the educational needs of the medical students. In addition to these medical program changes, dental student feedback and suggestions from the Commission on Dental Accreditation to reduce medical course content became impetuses for the renewal of the DMD program. Such an extraordinary opportunity to review and renew the DMD curriculum has been embraced by the Faculty of Dentistry since there is a keen interest to enhance students’ learning experiences both intra- and inter-professionally.

Speakers in this Symposium will provide the audience with a glimpse of the past, present, and future DMD program. The educational research that has informed the changes in our Faculty programs will be highlighted. Additionally, planned, meaningful learning opportunities with other health science students will be presented.

I would like to personally thank all of our speakers, and the Education Symposium & Research Day Organizing Committee: Manuela Boscenco, Ingrid Ellis, Sharleen Paredes, HsingChi von Bergmann, and Terry Wintonyk for their dedication and all of their contributions to make this day such a success.

Please enjoy meeting inspirational faculty and student researchers who are eager to have you view their research posters during the lunch break. Your interest and participation in this 2015 Education Symposium is most appreciated—thank you!

W. Leandra Best, DMD
Clinical Professor and Associate Dean of Academic Affairs
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<tr>
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<td>REGISTRATION &amp; CONTINENTAL BREAKFAST</td>
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<td>8:30 - 8:45</td>
<td>WELCOME</td>
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<td>Dr. Charles Shuler, Professor and Dean, UBC Faculty of Dentistry</td>
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<td>INTRODUCTION &amp; OVERVIEW OF THE DAY</td>
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<td>Dr. Leandra Best, Clinical Professor and Associate Dean of Academic Affairs, UBC Faculty of Dentistry</td>
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<td>9:00 - 10:00</td>
<td>THE DEVELOPMENT OF UBC'S FIRST DENTAL CURRICULUM</td>
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<td>Dr. Douglas Yeo, Professor Emeritus, UBC Faculty of Dentistry</td>
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<td>9:00 - 10:00</td>
<td>UBC DENTAL CURRICULA TODAY: INTEGRATION OF THE BIOLOGICAL, CLINICAL, AND BEHAVIOURAL SCIENCES</td>
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<td>Academic Advisory Team Members, DMD Program; Prof. Bonnie Craig, Director, Dental Hygiene Degree Program, UBC Faculty of Dentistry</td>
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<td>10:00 - 10:30</td>
<td>COFFEE BREAK</td>
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<td>10:30 - 11:00</td>
<td>INTERPROFESSIONAL EXPERIENTIAL EDUCATION: THE UBC EXPERIENCE WITH DENTISTRY AND PHARMACY</td>
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<td>Prof. Barbara Gobis, Director, Pharmacists Clinic, UBC Faculty of Pharmaceutical Sciences</td>
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<td>11:00 - 11:20</td>
<td>SUPPORTING THE GERIATRIC PATIENT WITH AN INTERPROFESSIONAL HEALTHCARE TEAM</td>
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<td>Dr. Leeann Donnelly, Assistant Professor, Department of Oral Biological &amp; Medical Sciences, UBC Faculty of Dentistry</td>
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<td>11:20 - 11:50</td>
<td>RESEARCH POSTER AWARDS PRESENTATION</td>
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<td></td>
<td>Dr. Edward Putnins, Professor and Associate Dean of Research, Graduate &amp; Postgraduate Studies, UBC Faculty of Dentistry</td>
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<td></td>
<td>Dr. Ravindra Shah, Associate Professor and Director of International Relations, UBC Faculty of Dentistry</td>
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<tr>
<td>11:50 - 1:00</td>
<td>LUNCH (BOX LUNCH PROVIDED) &amp; RESEARCH POSTER VIEWING</td>
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<td>Posters by undergraduate students, graduate students, postdoctoral fellows, research associates, visiting scientists, and faculty members</td>
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<tr>
<td>1:00 - 1:20</td>
<td>DENTAL PROFESSIONALS AS TEACHERS FOR THE NEW ERA: A PIPELINE MODEL FOR GRADUATE STUDENTS</td>
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<td></td>
<td>Dr. HsingChi von Bergmann, Associate Professor and Chair of the DMD Assessment Working Group, UBC Faculty of Dentistry</td>
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<tr>
<td>1:20 - 2:05</td>
<td>ENDURING KEYS TO ADULT LEARNING: WHAT DO WE KNOW NOW THAT WE DIDN'T KNOW 50 YEARS AGO? (KEYNOTE ADDRESS)</td>
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<td>Dr. Dan Pratt, Senior Scholar, Centre for Health Education Scholarship, Faculty of Medicine and Professor Emeritus, Faculty of Education, 3M National Teaching Fellow, The University of British Columbia</td>
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<td>2:05 - 2:20</td>
<td>WRAP-UP &amp; DISCUSSION</td>
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DOUGLAS YEO
ACADEMIC ADVISORY TEAM
BARBARA GOBIS
LEEANN DONNELLY
HSINGCHI VON BERGMANN
DAN PRATT
DOUGLAS YEO, DDS
Dr. Douglas Yeo is a UBC Professor Emeritus. He received his DDS in 1951 from the University of Toronto and began at UBC in 1964 as Director of what was then called the Department of Public & Community Dental Health. From 1977 to 1978 he served as the second Dean of the Faculty. He received the 1983 Canadian Dental Association Distinguished Service Award, the 1990 Award of Distinction from the University of Toronto, and the 1993 College of Dental Surgeons of BC Honoured Member Award. Dr. Yeo retired from UBC in 1987. At 90 years of age, he is an avid hockey player (left wing), skier (downhill), and cyclist (each year, he participates in Boomer’s Legacy Bike Ride, a 2-day, 240-km pedal from the Comox Valley to Victoria). He does this ride each year in honour of a young man from Comox called Andrew “Boomer” Eykelenboom who was a medic in the Canadian armed forces—incidentally, Dr. Yeo was stationed in England, France, and Holland during the Second World War. Along with sports, Dr. Yeo regularly volunteers at the Sonshine Lunch Club, a community service sharing nourishing food with people in need living in the Comox Valley where he resides.

THE DEVELOPMENT OF UBC’S FIRST DENTAL CURRICULUM
From a personal reflection of his early dental career to his encounter with Dr. S. Wah Leung, then to becoming Dean and retiring from dentistry altogether, and finally his later years entering Boomer’s Legacy and actively participating in raising charitable funds, a passion to help the community is the main thread that ties all of Dr. Doug Yeo’s memories together. Being one of the very few founding members who can still share his perceptions of what the UBC Faculty of Dentistry was originally like, Dr. Yeo’s stories of the past are aimed at reawakening a desire to serve society in today’s oral healthcare providers and researchers. Revisiting the curricular design from when our dental school first started may help people to conceptualize the curricular core.
ACADEMIC ADVISORY TEAM
The DMD Program’s Academic Advisory Team (AAT) consists of faculty representatives from developmental biology, oral biological sciences, diagnostic sciences, clinical sciences, and community services. They work closely with the Associate Dean of Academic Affairs to enhance faculty overall awareness of the DMD program; facilitate vertical integration and flow amongst all 4 years of the DMD program as well as horizontal integration and flow within each year of the program; facilitate communication and obtain input from all faculty members with respect to curriculum development; and identify curriculum challenges and propose recommendations to the Curriculum & Teaching Effectiveness Committee (CTEC) as the curriculum decision-making body. Ultimately, the AAT collaboratively enhances faculty ownership of curriculum development. Representatives presenting today include Drs. Leandra Best, Nancy Black, Lari Häkkinen, and Eli Whitney. Joining them is Professor Bonnie Craig, Director of the Dental Hygiene Degree Program.

UBC DENTAL CURRICULA TODAY: INTEGRATION OF THE BIOLOGICAL, CLINICAL, AND BEHAVIOURAL SCIENCES
Currently, the first and second year dental students are enrolled in many Faculty of Medicine courses; however, Medicine is renewing their curriculum in response to their accreditation requirements. Medicine’s proposed changes focus on educational benefits for medical students and not dental students. While Dentistry wishes to maintain an academic undergraduate affiliation with Medicine, Dentistry is not planning to enroll the dental students in Medicine’s newly proposed Years 1 and 2 curricula, thereby giving Dentistry the flexibility to manage all DMD curricula planning, timetabling, assessment methods, and student learning. Modules will be created within the existing first year DENT 410 course to include the “need to know” biomedical objectives agreed upon by the Faculty of Dentistry (2011–2012 TLEF-supported survey, Reaching Consensus Among UBC Dental Faculty and Students on Basic Biomedical Science Learning Objectives). This change in Dentistry’s curriculum provides Dentistry with the opportunity to consider deleting the irrelevant content from the DMD program, and subsequently it will open up time in the curriculum to enrich the dentally relevant content in all four years of DENT courses. In addition, an opportunity exists for faculty to explore and implement meaningful intra- and interprofessional activities. This session highlights the relevancy and rigor of the renewed curriculum, and focuses on the spiraled integration of the biological, clinical, and behavioural sciences. The goal of the renewed dental curriculum is to prepare students for the rest of their careers.
Barbara Gobis, BSc(Pharm), ACPR, MSc(Pharm)
Prof. Barbara Gobis joined the UBC Faculty of Pharmaceutical Sciences in 2013 to establish Canada’s first university-owned, licensed, pharmacist-led, patient care clinic. Before joining UBC, she worked in the private sector specializing in large-scale pharmacy practice change initiatives. Prof. Gobis holds an undergraduate pharmacy degree from UBC, a residency certificate from the Sunnybrook Health Sciences Centre in Toronto, and an MSc in Clinical Pharmacy from the University of Toronto.

INTERPROFESSIONAL EXPERIENTIAL EDUCATION: THE UBC EXPERIENCE WITH DENTISTRY AND PHARMACY
This presentation showcases two interprofessional education initiatives underway at the UBC Faculty of Pharmaceutical Sciences and the UBC Faculty of Dentistry. These initiatives facilitate student learning about each other’s scope of practice in the context of medication management. One initiative involves teams of 2nd year pharmacy and dental students completing assessments of prosthesodontic patients at the UBC Nobel Biocare Oral Health Centre. Teams complete a medication history and then identify and resolve actual or potential drug therapy problems. The second initiative has 4th year pharmacy and dental students working together to develop their interview skills and complete an accurate medication history for complex medical patients at the UBC Pharmacists Clinic.

Leeann Donnelly, CDA, DipDH, BDSc, MSc, PhD
Dr. Leeann Donnelly is an Assistant Professor at the UBC Faculty of Dentistry. In this role, she teaches in both the undergraduate and graduate programs and coordinates the Dental Hygiene Degree Program community service-learning (CSL) module for special care populations. Her areas of interest in teaching and research focus on oral malodor and access to care for marginalized populations, specifically frail elders, adults living with mental illness, persons living with HIV/AIDS, new immigrants and refugees, the working poor, and women and children impacted by the justice system.

SUPPORTING THE GERIATRIC PATIENT WITH AN INTERPROFESSIONAL HEALTHCARE TEAM
Meeting the oral health needs of residents in the complex environment of long-term care (LTC) requires an interprofessional approach. Dental geriatric education typically focuses on didactic and clinical experiences with elders, but is void of meaningful interactions with the other members of a resident’s healthcare team such as the physician, pharmacist, nurse, dietician, Director of Care, and recreation therapist who also have a role in the oral healthcare of the residents. This session will discuss the rationale for the implementation of a weekly interprofessional activity with dental hygiene students and a healthcare team to support the oral and overall health of geriatric patients as well as the education of undergraduate students.
HSINGCHI VON BERGMANN, BSc, MSc, PhD
Dr. HsingChi von Bergmann is an Associate Professor at the UBC Faculty of Dentistry. In this role, she mentors and conducts educational research. Her research foci include curriculum, instruction and assessment, problem-based learning, teacher beliefs and conceptions, and opportunities to learn. Prior to coming to UBC, Dr. von Bergmann was an Associate Professor in Science Education at the University of Calgary, where she was the Coordinator of Curriculum, Teaching & Learning in the Faculty of Education and an Evaluation Consultant for the University of Calgary’s Faculty of Science.

DENTAL PROFESSIONALS AS TEACHERS FOR THE NEW ERA: A PIPELINE MODEL FOR GRADUATE STUDENTS
With the increasing demands on supplying new faculty members and clinical instructors to many aging dental schools, a more formalized teaching and learning program can be an effective way to expose dental graduate students to the academic career option as a viable occupational path. It is also believed that enhanced knowledge and skills can foster improved interprofessional collaborative relationships between dental specialists and general dentists. This session will discuss the rationale for the Dental Graduate Student Instructors (GSIs) Teaching & Learning module, and its three years of implementation processes and outcomes.

DAN PRATT, PhD
Dr. Dan Pratt is a Professor of Adult & Higher Education in the Department of Educational Studies and holds a cross appointment in the Faculty of Medicine’s Centre for Health Education Scholarship (CHES). He was a faculty member for the American Academy of Orthopaedic Surgeons Educators’ Course (2004–2011) and is currently a faculty member for the Harvard Macy Institute for the Health Professions. Dr. Pratt has been a visiting professor and consultant at universities across North America, Europe, Asia, and Australia. He has received many awards; most recently, in 2012, Dan Pratt and John Collins won the Imogene Okes Research/Scholarship Award for their work on the validity and reliability of the Teaching Perspectives Inventory.

ENDURING KEYS TO ADULT LEARNING: WHAT DO WE KNOW NOW THAT WE DIDN’T KNOW 50 YEARS AGO?
Across 50 years, four concepts have been key to adult learning: prior knowledge, emotions, testing, and feedback. These are not new to anyone familiar with adult learning. But what we know about learning today may change how you think about teaching tomorrow. This session will challenge familiar assumptions about learner engagement. Each of the four concepts will be examined through the portal of a question or situation that challenges us to think about our assumptions as well as new evidence related to the “familiar four” keys to adult learning.
It continues to be my pleasure to be associated with the development and administration of Research Day 2015. This year we share the stage with an exciting day focused on curriculum renewal. However, we will still showcase the stimulating research that continues unabated in the UBC Faculty of Dentistry. Our faculty is loosely organized into three research clusters covering the areas of basic science, community/education, and clinical/biomaterials research.

Altogether, 54 abstracts have been submitted by undergraduate students, graduate students, postdoctoral fellows, research associates, visiting scientists, and faculty members. The titles are listed in this booklet and the research posters are available for all participants to view, read, and learn from. In addition, we continue our annual poster competition and will recognize our most successful undergraduate, MSc, and PhD student posters. As our clinical and non-clinical graduate programs continue to mature and expand, we fully anticipate an excellent competition.

Please enjoy all of the events associated with this day and do take time at our breaks to read and appreciate the research of our collective faculty and students.

Edward E. Putnins, DMD, PhD, DipPerio
Professor and Associate Dean of Research, Graduate & Postgraduate Studies
POSTER ABSTRACTS
Poster Competition Judges

DR. RA VINDRA SHAH (Chair)
DR. FERNANDA ALMEIDA
DR. MAZEN ALOTAIBI
DR. DIETER BRÖMME
DR. DONALD BRUNETTE
DR. S. ROSS BRYANT
DR. RICARDO CARVALHO
DR. ADRIAN DANESCU
DR. NANCY FORD
DR. KAVITA MATHU-MUJU
DR. BENJAMIN PLISKA
DR. CATHERINE POH
DR. CLIVE ROBERTS
DR. N. DORIN RUSE
DR. RANA TARZEMANY
DR. CHRISTOPHER WYATT
Annotating the N-Terminome of Human Dental Pulp
Abbey RS*, Eckhard U¹, Tharmarajah G², Matthew I¹, Overall CM¹
¹Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); ²Department of Medical Genetics, Faculty of Medicine, UBC

Cyclic Torsional Loading Decreased the Fatigue Resistance of K3XF Instruments
Alfadley A*, Campbell L¹, Haapasalo M¹, Wang Z¹, Du T¹, Qian W¹, Shen Y¹
¹Division of Endodontics, Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; ²Private Practice, Vancouver, Canada; ³Department of Stomatology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, China

Smad2 Overexpression Rescues the TGF-β3 Null Mice by Increased Apoptosis
AlMegbel AM*, Shuler CF¹
¹Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; ²Riyadh Military Hospital, Riyadh, Saudi Arabia

Smad2 Overexpression Induces Alveolar Bone Loss Through TNFα
Alotaibi MK*, Kitase Y¹, Shuler CF¹
¹Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; ²Riyadh Military Hospital, Riyadh, Saudi Arabia

Effect of NTP on Shear Bond Strength of Orthodontic Brackets
Arora D*, Carvalho R², Ruse D², Yen E¹
¹Division of Orthodontics, Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); ²Division of Biomaterials, Department of Oral Biological & Medical Sciences, Faculty of Dentistry, UBC

Mapping HIV-Related Health and Dental Services Available Across British Columbia
Aytoglu N*, Jessani A, Brondani M
Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Epithelial-Derived Microvesicles Regulate the Expression of Fibroblast Matrix Metalloproteinases
Bi J¹, Koivisto L¹, Owen G¹, Wang Z¹, Huang P¹,², Bi L¹, Shen Y¹, Heino F³, Haapasalo M¹, Häkkinen L¹, Larjava H¹
¹Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; ²Department of Biochemistry, University of Turku, Turku, Finland; ³Department of Stomatology, The Fourth Affiliated Hospital, Harbin Medical University, Harbin, China; ⁴Department of Stomatology, Tongji Hospital, Tongji Medical College, Huazhong University of Science & Technology, Wuhan, China

Platelet-Derived Cytokines in Human Gingival Crevicular Fluid
Brousseau-Nault M*, Kim H¹,²
¹Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); ²Centre for Blood Research, Faculty of Medicine, UBC

Analgescic and Antibiotic Prescribing Decisions by B.C. Dentists and Endodontists
Buttar R*, Aleksejūnienė J¹, Shen Y², Coil JM²
¹Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); ²Department of Oral Biological & Medical Science, Faculty of Dentistry, UBC

Pediatric Dental Practice-Based Research Network
Chung EE*, Mathu-Muju KR
Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada
Morpholino-Mediated Knockdown of PI15, a Novel Patterning Molecule
Kim S*, Richman JM
Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Screening Panoramic Radiograph Clinical Significance Prior to Complete Denture Fabrication
Kratz R*, Walton JN1, MacDonald D2, MacEntee MI1, Nguyen C1
1Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); 2Department of Oral Biological & Medical Sciences, Faculty of Dentistry, UBC

Exosite Inhibitors of Cathepsin K in Collagen Degradation
Law S*, Severino RP1,2, Roberge M1, Brömme D2
1Department of Biochemistry, Faculty of Medicine, The University of British Columbia, Vancouver, Canada (UBC); 2Department of Oral Biological & Medical Sciences, Faculty of Dentistry, UBC; 3Departamento de Química, Universidade Federal de Goiás, Brazil

Dentofacial Characteristics of Children Suspected of Obstructive Sleep Apnea
Lee J*, Chadha NK2, Pliska BT1
1Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Division of Pediatric Otolaryngology, BC Children's Hospital, Vancouver, Canada

Incidence of Malocclusion in Children with Sleep-Disordered Breathing
Lee K*, Huynh N1, Pliska B1, Lowe A1, Wensley D1, Almeida F1
1Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); 2Faculty of Dental Medicine, University of Montreal, Montreal, Canada; 3Divisions of Critical Care and Respiratory Medicine, Department of Pediatrics, Faculty of Medicine, UBC

Real-Time In Vivo Oral Pathology Using Optical Coherence Tomography
Lee NV*, Liu KYP1,2, Cahill L1, Lee AMD1, Anderson DW1, Lane P2, Poh CF1,2
1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); 2Integrative Oncology, BC Cancer Research Centre, Vancouver, Canada; 3Head & Neck Surgery, Faculty of Medicine, UBC

3D Facial Growth Analysis Shows Patterns Begin During Fetal Period
Lim SJ*, Smiley B, Diewert VM
Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Stimulated Saliva Rate Following Intensity-Modulated Radiation Therapy (IMRT)
Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Quantitative Tissue Pathology (QTP) for Nodal Disease Prediction in Oral Cancers
Liu KYP*, Ye M1, Guillaud M2, Poh CF1,2
1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Integrative Oncology, BC Cancer Research Centre, Vancouver, Canada

p16 Alteration and Progression of Oral Dysplasia
Lubpairee T*, Rosin M3, Reuschchenbach M1, Prigge E-S3, von Knebel Doeberitz M3, Zhang L1
1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Oral Cancer Prevention Program, BC Cancer Research Centre, Vancouver, Canada; 3Department of Applied Tumor Biology, Institute of Pathology, Heidelberg University Hospital, Heidelberg, Germany
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<td>A Retrospective Review of Referrals for Cone-Beam Computed Tomography</td>
<td>MacDonald D*, Bhatt M, Bunting N, Esteves A</td>
<td>1Department of Oral Biological &amp; Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); 2Department of Oral Health Sciences, Faculty of Dentistry, UBC</td>
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<td>Elastin Digestion by Cathepsins Increases Susceptibility to Mineralization In Vitro</td>
<td>Mackenzie N*, Panwar P, Zhu D, MacRae V, Brömme D</td>
<td>1Department of Oral Biological &amp; Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2The Roslin Institute, The University of Edinburgh, Edinburgh, United Kingdom</td>
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<td>Analysis of Early Fetal Facial Growth and Jaw Relationships</td>
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<td>1Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Department of Oral Biological &amp; Medical Sciences, Faculty of Dentistry, UBC</td>
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<td>Novel Grooved Substrata Stimulate Macrophage Fusion, CCL2, and MMP-9 Secretion</td>
<td>Moon H*, Michel CCV, Kulpa A, Jaeger NAF, Spencer ND, Waterfield JD, Brunette DM</td>
<td>1Department of Oral Biological &amp; Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Department of Electrical &amp; Computer Engineering, Faculty of Applied Science, UBC; 3Swiss Federal Institute of Technology, Zürich, Switzerland</td>
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<td>Inflammatory Proteomics—The Protease Web in Normal and Inflamed Gingiva</td>
<td>Nguyen K*, Eckhard U, Marino G, Matthew I, Overall CM</td>
<td>Department of Oral Biological &amp; Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada</td>
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<td>Penicillin Allergy Impact on Implant Therapy: a Retrospective Study</td>
<td>Noroozi M*, Larjava H, French D, Shariati B</td>
<td>1Department of Oral Biological &amp; Medical Science, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Private Practice, Calgary, Canada; 3Department of Oral Health Sciences, Faculty of Dentistry, UBC</td>
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<td>3D Cultures Uncover Distinct Contractility of Skin and Gingival Fibroblasts</td>
<td>Oliver D*, Mah W, Jiang G, Larjava H, Häkkinen L</td>
<td>Laboratory of Periodontal Biology, Department of Oral Biological &amp; Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada</td>
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<td>Novel Approach to Bone Resorption Inhibition: Cathepsins K Exosite Inhibitors</td>
<td>Panwar P*, Soe K, Guido RVC, Bueno RV, Delaisse JMF, Brömme D</td>
<td>1Department of Oral Biological &amp; Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Clinical Cell Biology, Vejle Hospital/Lillebaelt Hospital, Institute of Regional Health Research, University of Southern Denmark, København, Denmark; 3Laboratório de Química Medicinal e Computacional, Centro de Inovação em Biodiversidade e Fármacos, Instituto de Física de São Carlos, Universidade de São Paulo, Brazil</td>
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<td>Pediatric Hospital Dental Emergency Cases: a Quantitative and Qualitative Analysis</td>
<td>Park JC*, Campbell KM</td>
<td>1Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Department of Dentistry, BC Children’s Hospital, Vancouver, Canada</td>
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<td>Degree of Conversion of Composites at UBC Dentistry: Pilot Study</td>
<td>Peres BU*, Vidotti HA, Manso AP, Esteves A, Carvalho RM</td>
<td>Department of Oral Biological &amp; Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada</td>
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Temporal Changes in Toluidine Blue Positivity Signal Change in Risk
Rock LD*, Rosin MP*, Zhang L*, Laronde DM*  
1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Oral Cancer Prevention Program, BC Cancer Research Centre, Vancouver, Canada; 3Department of Biomedical & Physical Kinesiology, Simon Fraser University, Burnaby, Canada

Oral Bacterial Biofilm Promotes Inflammatory Response in Gingival Epithelial Cells
1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Center of Stomatology, Tongji Hospital & Medical College, Huazhong University of Science & Technology, Wuhan, China

Improved Killing of Enterococcus Faecalis Biofilms by Modified Photoactivated Disinfection
Stojicic S*, Haapasalo M  
Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Professional Uncertainty in Providing Dental Care for CSHCN
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Connexin 43 Function in Human Gingival Wound Healing and Fibroblasts
Tarzemany R*, Jiang G, Larjava H, Häkkinen L  
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Secondary Oral Malignancies (SOM) in Hematopoietic Stem Cell Transplant Patients
Thong E*, Taleghani M, Liu KYP, Williams M, Poh CF  
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Novel Monoamine Oxidase Inhibitor Downregulation of LPS-Induced Pro-Inflammatory Cytokines
Tra MC*, Goebeler V, Putnins EE  
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Platelet Factor 4 Signalling in Human Gingival Fibroblasts
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Regulation of Keratinocyte Function by Skin and Gingival Fibroblasts
Vatandoost K*, Mah W, Jiang G, Larjava H, Häkkinen L  
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Are Your Loupes Working for You? An Exploratory Study
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For full abstracts see www.dentistry.ubc.ca/researchday/2015/abstracts.pdf
Tooth Replacement and the Effect of LiCl in Leopard Geckos
Wong AC*, Grieco TM, Richman JM
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Developing a Risk Model for Oral Cancer Recurrence
Wu KY*, Rosin MP2,3, Zhang L1,3, Laronde DM1,3
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Exosite Inhibitors in Cathepsin K from Kidney-Tonifying Chinese Herbs
Xue L*, Brömme D
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Analysis of CatK Exosite Inhibitors Derived from Computational Molecular Docking
Zbarsky S*, Panwar P, Brömme D
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For more information on graduate programs visit www.dentistry.ubc.ca/grad or contact: Vicki Koulouris
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**GRADUATE RESEARCH OPPORTUNITIES**

**PhD or MSc in Craniofacial Science**
The UBC Faculty of Dentistry offers advanced study leading to a PhD or MSc in Craniofacial Science. The PhD program requires the successful completion of a research-specific curriculum, a comprehensive exam, and defense of a research-based thesis. A minimum of four years of full-time study is typically required. The MSc program requires successful completion of a research-specific didactic curriculum in conjunction with a research-based thesis. This program typically requires two years of full-time study; however, an extended part-time option for an MSc degree is available. Research options in one of the following three broad areas of study are available:

- Population health research explores the complex interactions (social, cultural, environmental) that affect the oral health of individuals, communities, and populations.
- Oral health-related clinical research includes both interventional and observational studies focusing on the following: disease prevention, diagnosis, risk, treatment, prognosis, and health care.
- Basic science research in the areas of biomaterials, cell biology, developmental biology, microbiology, and molecular biology.

These graduate programs are available as stand-alone degrees or may be completed as a combined diploma in a clinical specialty with a PhD or MSc degree (see criteria below). Clinical specialty training options are available in the following areas.

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**Endodontics**

PhD or MSc combined with a Diploma in Endodontics
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Endodontics

Graduates will be eligible to take the examinations for specialty certification in endodontics offered by the Royal College of Dentists of Canada and the American Board of Endodontics.

**Research Focus**
- eradication of microorganisms from the root canal system
- development of unique \textit{in vitro} and \textit{ex vivo} models for biofilms which simulate oral \textit{in vivo} biofilms
- industry collaborations on new devices to improve antimicrobial solutions
- safety and effectiveness of instrument systems to deliver disinfecting agents into the root canal
- impact of file design on the eradication of root canal microbes

**Clinical Training**
- treatment management (including surgery) of diseases and trauma of the tooth root and pulp

**Criteria**
- Applicants must hold a DMD or its equivalent

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**Orthodontics**

PhD or MSc combined with a Diploma in Orthodontics
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Orthodontics

Graduates will be eligible to take the examinations for specialty certification in orthodontics offered by the Royal College of Dentists of Canada and the American Board of Orthodontics.

**Research Focus**
- craniofacial morphology and function in different populations
- efficiency and efficacy of treatment modalities
- societal and economic strategies that govern access to care
- craniofacial molecular and cellular control mechanisms
- impact of biomaterials on delivering orthodontic mechanics

**Clinical Training**
- diagnosis, prevention and treatment management of abnormal congenital or developmental relationships of the dentofacial anatomy from infancy to adulthood in diverse populations

**Criteria**
- Applicants must hold a DMD or its equivalent
- Postgraduate clinical and/or academic experience preferred
### Pediatric Dentistry

PhD or MSc combined with a Diploma in Pediatric Dentistry
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Pediatric Dentistry

Graduates will be eligible to take the examination for specialty certification in pediatric dentistry offered by the Royal College of Dentists of Canada and the diplomate examination of the American Board of Pediatric Dentistry.

**Research Focus**
- biomedical research (craniofacial development)
- clinical research (facial symmetry of cleft lip and palate)
- population health and health services research (oral health promotion and access to care for disadvantaged children)

**Clinical Training**
- diagnostic, preventive, therapeutic and consultative expertise for children and adolescents including those with special healthcare needs at BC Children’s Hospital Dental Department, Oral Health Centre at UBC Vancouver, and community settings throughout the province

**Criteria**
- Applicants must hold a DMD or its equivalent

### Periodontics

PhD or MSc combined with a Diploma in Periodontics
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Periodontics

This program is recognized by the American Dental Association and the Academy of Periodontology. Graduates will be eligible to take the examination for fellowship in the Royal College of Dentists of Canada and the board examination of the American Academy of Periodontology.

**Research Focus**
- molecular pathology of periodontal disease
- periodontal and skin wound healing
- clinical aspects of tissue healing around implants
- stem cell-mediated regeneration of lost tissues

**Clinical Training**
- management of tooth-supporting structures using non-surgical and surgical procedures
- tooth replacement with implants when needed

**Criteria**
- Applicants must hold a DMD or its equivalent
Prosthodontics
PhD or MSc combined with a Diploma in Prosthodontics
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Prosthodontics
Graduates will be eligible to take the examinations for specialty certification in prosthodontics offered by the Royal College of Dentists of Canada and the American Board of Prosthodontics.

Research Focus
- biomaterials
- caries management
- community healthcare needs
- geriatric dentistry
- oral cancer rehabilitation
- oral implants and related prostheses
- psychosocial aspects of aging
- xerostomia

Clinical Training
- diagnosis, restoration and maintenance of oral function, comfort, appearance and health of patients by the restoration of natural teeth and/or the replacement of missing teeth and contiguous oral and maxillofacial tissues with artificial substitutes
- aesthetics/cosmetic dentistry
- crowns, bridges, veneers, inlays
- complete and removable partial dentures
- dental implants
- TMD-jaw joint problems
- traumatic injuries to the structures of the mouth

Criteria
- Applicants must hold a DMD or its equivalent

Dental Public Health
MPH combined with a Diploma in Dental Public Health
- Master of Public Health degree from the UBC School of Population & Public Health
- Diploma in Dental Public Health from the UBC Faculty of Dentistry
This 2.5 year non-clinical combined Dental Public Health degree is a non-thesis, course-based program that connects the academic, service, and international research excellence of the Faculty of Dentistry with the interdisciplinary academic environment offered by the School of Population & Public Health.

Research Focus
- community-based health programs and interventions
- health disparities and determinants of oral health
- health policy and critical issues in dental public health
- program evaluation and oral health services utilization
- access to care by marginalized communities, including First Nations and Inuit populations
- data analysis on health expenditures and on provincial, national, and international data sets

Field Experience
- practicum placement at local, national, or international organizations
- development of a major project via a learning contract
- production of a peer-reviewed publication
- hands-on activities

Criteria
- Applicants must hold either a DMD or its equivalent, or a BDSc (Dental Hygiene) or equivalent dental hygiene education with a 4-year bachelor’s degree
POSTGRADUATE OPPORTUNITIES

General Practice Residency Program
UBC Dentistry and affiliated teaching hospitals offer positions in a one- or two-year hospital-based dental residency program (General Practice Residency, or GPR) beginning in June of each year. The residencies are salaried positions with union benefits, including one month of vacation.

The GPR program is centered at Vancouver General Hospital in the oral health ambulatory care unit, the wards, the operating room, and the emergency room. Most resident activities relate to the evaluation and provision of care to patients who are medically complex, hospitalized, have complex orofacial problems, need the operating room, or have attended the hospital emergency department.

Residents may also participate in IV sedations, oral medicine, endodontics, pediatric dentistry, oral and maxillofacial surgery, as well as off-service rotations that may include OMFS, pathology, ENT, plastic surgery, anesthesia, internal medicine, a rotation in Vietnam, and the ER. Please note that this is not an advanced education in general dentistry (AEGD) program.

Selection is by application and personal interview. Eligible candidates must be graduates of an accredited Canadian or US dental school; foreign graduates are eligible to apply provided they have passed the National Dental Examining Board of Canada (NDEB) examinations.

The application form and an information sheet are available for download in PDF format. Applications may be obtained at www.dentistry.ubc.ca, under education/postgraduate programs.

Oral Medicine and Oral Pathology Residency Program
- Hospital-based postgraduate specialist residency
- Three pathways: Oral Medicine (OM, three years), Oral Pathology (OP, three years), or Combined (OMOP, four years)

Completion of any of the three pathways leads to a certificate and eligibility for the Royal College of Dentists of Canada fellowship examinations.

Local hospital-based training sites
- UBC-affiliated teaching hospitals: BC Cancer Agency, Vancouver Hospital & Health Sciences Centre, St. Paul’s Hospital

Clinical practice component (training diagnosis, assessment, and management)
- oral mucosal disease
- orofacial disorders associated with aging, systemic disease, and medical therapies
- non-surgical salivary gland disorders
- rotations in anesthesia, internal medicine, rheumatology, neurosciences, dermatology, diagnostic pathology, oncology, otolaryngology, surgical pathology (including autopsy), head and neck pathology, and dermatopathology
- OM pathway: additional training in dental management of medically complex patients and diagnosis and treatment of orofacial pain and neurosensory disorders
- OP pathway: additional training in surgical and anatomical histopathology and laboratory procedures, techniques, and diagnosis

Didactic component
- postgraduate-level seminars, case presentations, and literature reviews
- teaching rounds
- ongoing basic and/or clinical research studies
This cluster encompasses groups engaged in research on cancer diagnosis and prevention, dental biofilms, dental hygiene, dental instruments and materials, dental sleep medicine, forensic dentistry, and interactive dental anatomy. Our areas of expertise include biomaterials, dental morphology, obstructive sleep apnea, oral cancer, and root canal irrigation. We study matters such as bacterial eradication, cellular interactions, cephalometrics, community outreach programs, computational fluid dynamics, diagnostic tools, DNA analysis, fracture mechanisms, molecular markers, novel disinfection strategies, oral care products, surface characterization, and treatment strategies.

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COMMUNITY & EDUCATIONAL RESEARCH CLUSTER

The research in this cluster relates to three of the four Canadian Institutes of Health Research themes: health services research; social, cultural, environmental, and population health; and clinical research—and to a range of educational studies. These domains are loosely interconnected and employ various quantitative and qualitative research methods and knowledge transfer. Our members conduct studies on diverse topics such as healthcare promotion, oral implants, dental caries, systematic literature reviews, and community service learning.

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iMatrix is an interactive research cluster combining the research interests of 12 highly active laboratories in oral and biomedical sciences. We conduct basic science research in areas such as cancer, cell behaviour, craniofacial development, integrins, molecular biology, periodontal disease, proteases, proteomics, and wound healing. Highly motivated undergraduate and graduate students, postdoctoral fellows and other trainees, as well as interested collaborators, are welcome to contact our member laboratories.

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**DIETER BRÖMME**
Lysosomal proteases and their role in health and disease: protease mechanisms, inhibitors, mouse disease models

**DONALD BRUNETTE**
Regulation of cell behaviour on implant surfaces by substratum topography

**VIRGINIA M. DIEWERT**
Prenatal development of the human face: 3D analyses of growth and variations contributing to cleft lip, cleft palate, and jaw discrepancies

**NANCY FORD**
Micro-computed tomography, small animal imaging, cone beam CT

**LARI HÄKKINEN**
Cell to extracellular matrix interactions in wound healing

**HUGH KIM**
Biochemical signalling mechanisms that regulate platelet function

**HANNU LARJAVA**
Cell adhesion, integrins and signalling in wound healing and periodontal disease

**CHRISTOPHER OVERALL**
Proteomic investigation of inflamed periodontal and synovial tissues and cancer to elucidate proteolytic mechanisms of cell signalling and in regulating inflammation

**EDWARD PUTNINS**
Regulation and protection of mucosal and skin epithelial cell barrier integrity during inflammation

**JOY RICHMAN**
Evolution and development of the face and teeth using bird and reptilian models

**CLIVE ROBERTS**
Extracellular matrix remodelling and cell biology in inflammation, fibrosis, and wound healing

**CHARLES SHULER**
Studies focused on characterizing the molecular mechanisms regulating secondary palatal fusion with specific emphasis on the TGFβ signalling pathway
At Sinclair Dental we understand the importance of growth in the undergraduate, graduate, and postgraduate programs. The UBC Dental Symposium is a great avenue for advancing the field of dentistry and we look forward to supporting you in your journey.
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GRADUATE and POSTGRADUATE STUDIES

GRADUATE PROGRAMS
Craniofacial Science

SPECIALTY GRADUATE PROGRAMS
Endodontics
Orthodontics
Pediatric Dentistry
Periodontics
Prosthodontics
Dental Public Health

POSTGRADUATE PROGRAMS
General Practice Residency Program
Oral Medicine and Oral Pathology Residency Program

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