

NEWSLETTER - DECEMBER 2004

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1. GENERAL REMARKS

At the meeting on November 10, we discussed a quarterly newsletter. This current one is the first of its kind. The idea is, that everyone/every subgroup involved with the Jaw Mechanics group just sends me a few paragraphs about their recent accomplishments, their work in progress, or their future plans. It's best to send me a plain text or a Word document via email (though most other file formats are certainly okay too). This allows me to quickly copy and paste the text into the Newsletter template and email it to everyone. I will not do any editing to the paragraphs, although Andrew already thought that his description of the Otago group as "world-famous" is somewhat over the top.

If you feel like my email list for the newsletter is not complete, please feel free to forward the newsletter. The discussions are open to anyone who is interested in this work. Our aim is to increase awareness and communication amongst those of us in NZ with similar research interests. All suggestions, ideas, comments, etc. are always very welcome. Please email them to me (o.rohrle@auckland.ac.nz).

I hope this quarterly newsletter is helpful in giving updates to anyone who is interested to do research in fields of modeling the human mastication process. Thank you. - Oliver Rohrle

2. CRANOFACIAL BIOMECHANICS AT OTAGO

Craniofacial biomechanics is a relatively new area of research. It addresses the interface between clinical practice and basic science by providing translation research from bench to bedside. By creating a Craniofacial Biomechanics and Oral Sciences Research Centre within the Faculty of Dentistry, the University recognises the importance of fostering the development of state of the art capability in

this area. This research will address some of the most critical issues surrounding delivery of dental healthcare in New Zealand. It will include new methods for the prevention and treatment of oro-dental diseases such as caries, malocclusion, gum disease and deformities of growth. It will also address the issues of tooth loss in the elderly and how this affects their nutrition.

The New Zealand Health Strategy emphasises the need to eliminate the disparities in health status among Maori, Pacific Peoples and younger and older New Zealanders. The identification of pressing clinical needs and the development of new treatment strategies and materials will make a major contribution to this objective.

Recent Developments We recently hosted both the Auckland team (Andrew Pullan, Iain Anderson and Oliver Rohrle) as well as the Massey team (John Brondlund, Peter Xu and Kylie Foster) in the Department of Oral Sciences. Our team consist of myself, Ionut Ichim, and Michael Swain, who were joined by Bhavia Sing (MDS student) and Richard O'Keefe (data mining expert). Discussions were dynamic and exciting, and resulted in a number of initiatives. The First, and most exciting one was the decision to run a Craniofacial Biomechanics Symposium during the 45th ANZ Division of the International Association for Dental Research Meeting (25-28 Sept, 2005) in Queenstown. Our quest lecturer is the world-famous Andrew Pullan! This symposium will not only provide us with a chance to formally present our results, but also to have Australian input, as members of the Australian Jaw Joint Project will be attending. For your information, I enclose an attachment of the formal announcement. Secondly, we got valuable input on our intra-oral pressures project, which we'll action in February next year. This promises to deliver great results that both John's and Andrews groups can use. Finally, we agreed to write a Marsden Grant Application jointly between us and Massey. We are currently working on this.

3. HAPPENINGS AT THE BIOENGINEERING INSTITUTE AT THE UNIVERSITY OF AUCKLAND.

The people involved with this project at the Bioengineering Institute of the University of Auckland are Andrew Pullan (PI of the main grant), Iain Anderson (Orthopedic), Oliver Rohrle (post-doc), and Nina Van Essen (PhD student).

About three years ago, the Bioengineering Institute began a NERF-funded project to develop a musculo-skeletal model of the human body to help build a new industry in New Zealand based around this work. This year, the Bioengineering group at Auckland got a FRST grant to continue and expand this work. One major part of this grant involves jaw and teeth mechanics (of which Andrew is the PI) and its applications. The past years Nina Van Essen researched for her PhD (with support from AgResearch) on various models involving the mandible. Based on her work, we want to continue to do research on the TMJ as well as start new initiatives to model soft tissues such as the gum (including the tooth), the tongue, and its impact on applications, like in the field of orthodontics. During a visit with the Otago group, we identified several possible collaborations. One includes modeling and analysing new structures/forms of teeth implants.

Part of the funding of this FRST grant includes a 3-year post-doc position, on which we could sign Oliver Rohrle. He joined the Bioengineering Institute on November 1. He just recently graduated from the Applied Mathematics department of the University of Colorado at Boulder. He has a strong background in the field of numerical simulation, but only some background in the human mastication process. His first goal is to get acquainted with this field.

Nina is currently in the process of finishing and writing up her PhD thesis. She recently submitted a paper to *"Cells, Tissues, Organs"* with the title *"Anatomically based modelling of the human skull and jaw"*. This paper was a result of attending *"The third scientific meeting of the TMJ association"* earlier this year.

Part of an ongoing project is to obtain data of the human mastication process. To do so, we use the motion tracking system of the University of Auckland located on the Tamaki campus. (For more general information go to <http://www2.auckland.ac.nz/tmk/ses/research/biomechanics/biomech.html>). This system enables us to track the movement of the mandible while chewing. To get a realistic set of data, we got a custom-made brace, which is attached to the lower front teeth and allows us to record the location of three markers fixed on the brace (each about 8cm apart) while chewing on “something”. In a next step, we would like to get some more realistic data of the chewing process. To do so, Kylie Foster from the Massey Team will join us for the next tests and provide us with some specially engineered food (which she used already for various other projects during her stay in France). This should give us a “standardized” set of data, which we can use then for different purposes within the project. For example, instead of modeling the muscles actively involved in the mastication process, we can use this data to “passively” simulate the mastication process. We planned on getting these experiments done before Christmas, but unfortunately, the person whom we fitted the brace for, had to apologise because of personal reasons. We expect to do the test instead early next year.

4. DISCUSSION ON HOW TO CALL OURSELVES AS A GROUP?

1. Andrew and Jules played around with the word “BIOMOUTH”
2. Jaw and Mastication Group

For more, see next page.

5. ANNOUNCEMENT OF THE 45TH ANZ DIVISION OF THE INTERNATIONAL ASSOCIATION FOR DENTAL RESEARCH MEETING (25-28 SEPT, 2005) IN QUEENSTOWN.



**45th Annual Meeting of the
AUSTRALIAN / NEW ZEALAND DIVISION OF THE
INTERNATIONAL ASSOCIATION FOR DENTAL RESEARCH**

Sunday 25th ~ Wednesday 28th September 2005



Millennium Hotel, Queenstown, New Zealand

Keynote Speakers:
Prof Jimmy Steele, University of Newcastle upon Tyne, UK
Prof Lakshman Samaranayake, University of Hong Kong

Symposia:
Oral health of older adults
Oral microbiology: novel approaches to preventing oral microbial diseases
Dental education and AASD symposium
Fluorosis/enamel defects in child populations in Australia and New Zealand
Craniofacial biomechanics
Oral implantology
Biomaterials

Website: www.otago.ac.nz/iadr
Contact: richard.cannon@stonebow.otago.ac.nz

On-line registration opens: 1 February 2005
Early-bird registration deadline: 26 August 2005

On-line abstract submission opens: 1 February 2005
Abstract deadline: 12 August 2005

See you there!



Colgate