



Internship at Waterloo University and Current State of PhD Thesis

Matúš Ranuša

Supervisor: doc. Ing. Martin Vrbka, PhD

Institute of Machine and Industrial Design

Faculty of Mechanical Engineering

Brno University of Technology

IMID seminar 2016, FME BUT
12th October 2016



Institute of Machine
and Industrial Design



Internship at Waterloo University

Waterloo, Ontario, Canada

- City in Southern Ontario
- Population 98,780
- Next the city of Kitchener



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Waterloo, Ontario



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University of Waterloo

University of Waterloo, Ontario, Canada

- Internship (6 Jun 2016 – 27 August 2016)
- Established 4 July 1956
- **1,099** Academic staff
- **35,900** Students
- **Faculties**
 - Applied Health Sciences
 - Arts
 - Engineering
 - Environment
 - Mathematics
 - Science

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Campus - University of Waterloo



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Research Programme – Structure



Department of Mechanical and
Mechatronics Engineering

Professor
John B. Medley



Western University, London
Bone and Joint Institute

Assistant Professor
Matthew G. Teeter



Samples



13 retrieval liners

Analysis

Computer Tomography
&
Optical Scanning

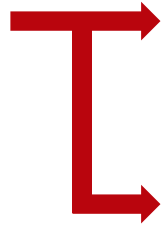
Comparison with clinical data





Research programme – Western University

13 retrieval liners



CT measurement

X-ray Evaluation

- Analysis of volumetric wear
- Determination of angles
- Comparison with clinical data
- Deformation of cups



CT eXplore speCZT



Stereoradiography



ROBARTS research center

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Research Programme – University of Waterloo

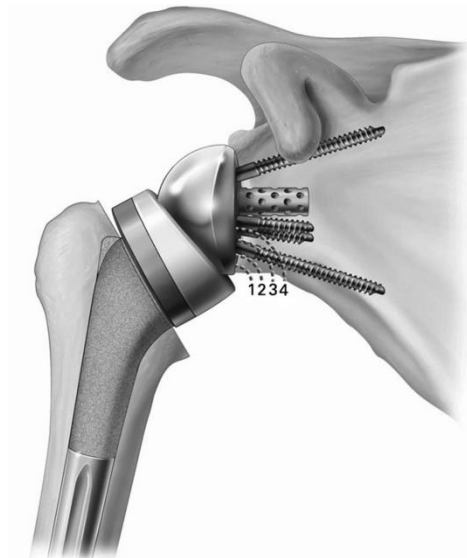
Reverse shoulder joints



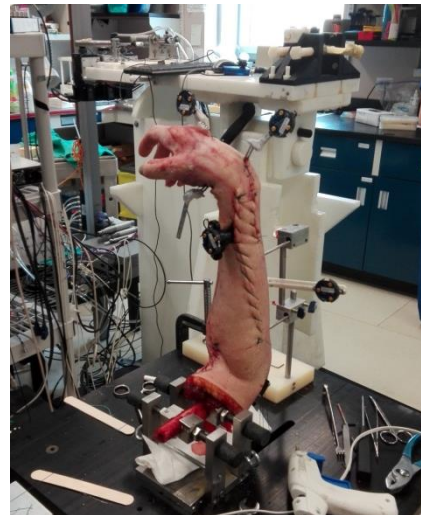
CT measurement

- Analysis of volumetric wear
- Wear scare
- Comparison with new model
- First study

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Reverse shoulder replacement



Wrist kinematic



Retrieval joint replacements



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Research Programme – Results

Possible Cooperation

- Waterloo University
 - John B. Medley – Shoulder joints
 - Dan Langhor – Kinematic of wrist
- Western University
 - Matthew G. Teeter – CT analysis of hips and knees

Publications

SUBMITTED:

- Wear and roughness of bearing surface of retrieved polyethylene Bicon cups
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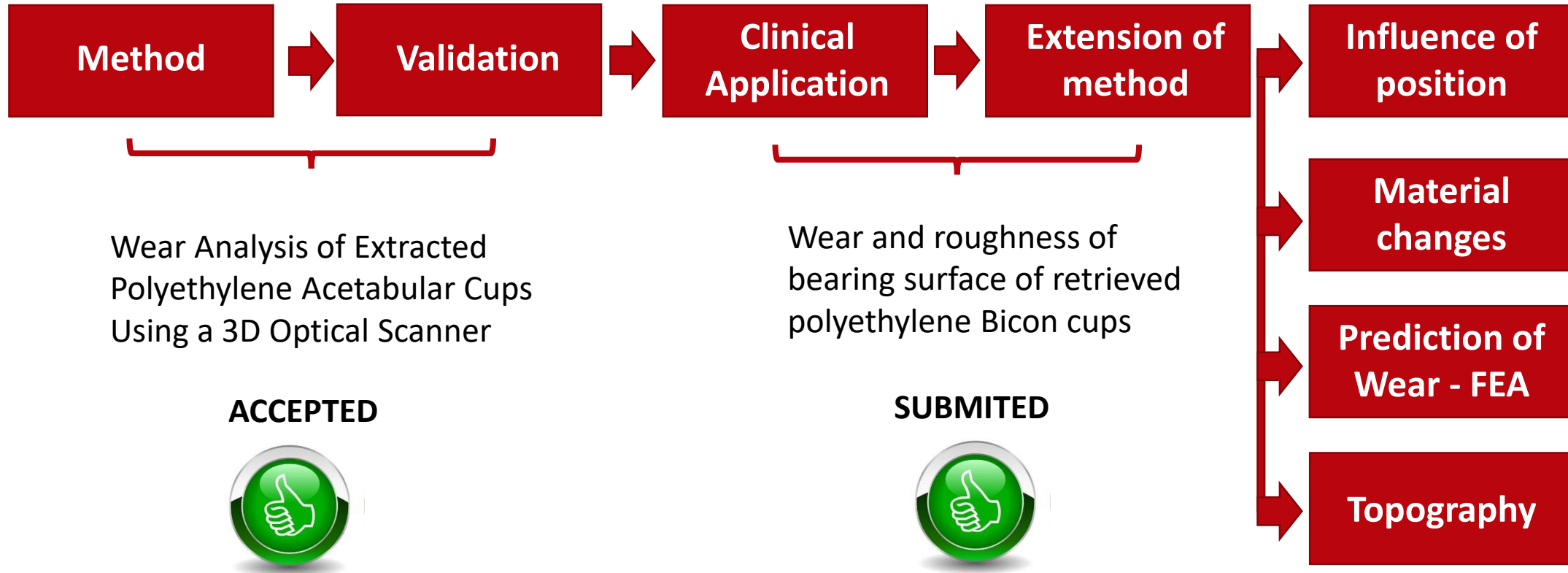
POSSIBLE FUTURE PUBLICATIONS:

- Influence of Positioning Retrieved Acetabular Liners in Vivo on the Wear Rate Determined by micro CT
- Analysis of retrieved cups by Raman measurement
- Analysis of retrieved polyethylene reverse shoulder cups

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Current State of PhD Thesis





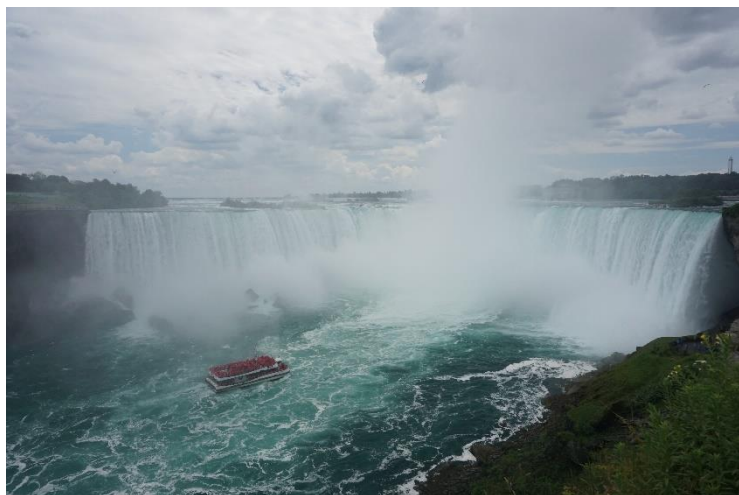
Highlights



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Toronto – Niagara Falls



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Canadian Rockies



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Thank you for your attention.

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Western



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<http://uk.fme.vutbr.cz/>



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