

Personal Info



Name: Ralph Müller

Year and place of birth: May 5, 1964; Schaffhausen, Switzerland

Present affiliations and functions: Professor of Biomechanics, Institute for Biomechanics, Head, Laboratory for Bone Biomechanics, ETH Zürich, Zürich, Switzerland

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Short CV

1. Education/training:

- 1984 Matura Type C, Kantonsschule Reussbühl, Lucerne, Switzerland - Natural Sciences
- 1990 Dipl. Ing. ETH, ETH Zürich - Electrical Engineering
- 1994 Dr. sc. ETH, ETH Zürich - Electrical Engineering
- 1995 Postdoctoral training, Institute for Biomedical Engineering, University and ETH Zürich, Zürich, Switzerland
- 1996 Postdoctoral training, Orthopedic Biomechanics Laboratory, Harvard Medical School, Boston, USA

2. Professional affiliations

- 1997 - 1999 Instructor in Orthopedic Surgery, Harvard Medical School, Boston, USA
- 1999 - 2002 Assistant Professor of Orthopedic Surgery (tenure-track), Harvard Medical School, Boston, USA
- 2000 - 2006 SNF Professor of Bioengineering, Department of Information Technology and Electrical Engineering, ETH Zürich, Zürich, Switzerland
- 2001 - 2003 Adjunct Assistant Professor by courtesy, Department of Mechanical and Process Engineering, ETH Zürich, Switzerland
- 2004 - 2006 Assistant Professor by courtesy, Department of Mechanical and Process Engineering, ETH Zürich, Switzerland
- 2006 - 2010 Associate Professor of Biomechanics, Department of Mechanical and Process Engineering, ETH Zürich, Switzerland
- 2010 - 2011 Professor of Biomechanics, Department of Mechanical and Process Engineering, ETH Zürich, Switzerland
- Since 2012 Professor of Biomechanics, Department of Health Sciences and Technology, ETH Zürich, Switzerland

Since 2012 Professor by courtesy, Department of Mechanical and Process Engineering and Department of Information Technology and Electrical Engineering, ETH Zürich, Switzerland

3. Other experience and major activities

- Since 1990 Advisor of 268 current and past bachelor, semester and master thesis projects.
- 1995 Micro-Tomography Project Manager for the European Union project BIOMED1, Computed Tomography Research Group (Prof. P. Rügsegger), ETH Zürich, Switzerland
- Since 1996 Active in conference organization (e.g. Organizer International Symposium on "Bone Architecture and the Competence of Bone").
- 1997 - 2000 Research Fellow, Center for Engineering in Medicine (Prof. M. L. Yarmush), Harvard Medical School, Boston, USA
- 1999 - 2000 Associate Director, Orthopedic Biomechanics Laboratory, Department of Orthopedic Surgery (Prof. S. J. Lipson), Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, USA
- 1999 - 2000 Member, Academic Computing Executive Oversight Committee, Beth Israel Deaconess Medical Center, Boston, USA
- 2000 - 2006 Head, Bioelectronics Group, Department of Information Technology and Electrical Engineering, ETH Zürich, Switzerland
- Since 2000 Advisor of 38 current and past doctoral thesis projects.
- Since 2001 Co-organizer and Track Advisor Biomechanics, Graduate Program in Biomedical Engineering, ETH Zürich, Switzerland
- 2003 - 2008 President, Swiss Society for Biomedical Engineering (SSBE)
- 2004 - 2005 Coordinator, Biomedical Engineering, ITET Pavillon, 150 Years ETH Celebration, Department of Information Technology and Electrical Engineering, ETH Zürich, Switzerland
- 2004 - 2007 Member and Chair, Medical Review Committee, European Synchrotron Radiation Facility (ESRF), Grenoble, France
- 2004 - 2008 Chair, Awards Selection Committee, European Society of Biomechanics
- 2005 - 2006 Member, Imaging Strategy Committee, Vice President of Planning and Logistics, ETH Zürich, Switzerland
- 2005 - 2008 Coordinator, ETH Bioengineering Cluster (BEC), Initiative on Bioengineering, Biosystems, Biotechnology (BEST)
- 2005 - 2008 Director, Center for Bioengineering Research and Education, ETH Zürich, Switzerland
- 2005 - 2013 Member, Center for Imaging Science and Technology (CIMST), ETH Zürich, Switzerland
- 2006 - 2008 Chair, Imaging and Diagnostics Committee, Orthopedic Research Society (ORS)
- 2006 - 2013 Member, Materials Research Center (MRC), ETH Zürich, Switzerland
- 2006 - 2008 Associate Director, Institute for Biomechanics, ETH Zürich, Switzerland
- 2008 - 2010 President, European Society of Biomechanics (ESB)

- 2008 - 2011 Member, Admissions Committee, Department of Mechanical and Process Engineering, ETH Zürich, Switzerland
- 2008 - 2012 Delegate of the President, Initiative on "Medical Engineering and Health", ETH Zürich, Switzerland
- 2008 - 2013 Director, Specialization in Biomechanics, Program in Human Movement Sciences, ETH Zürich, Switzerland
- 2008 - 2013 Member, National Competence Center in Biomedical Imaging (NCCBI), Switzerland
- 2008 - 2013 Director, Institute for Biomechanics, ETH Zürich, Switzerland
- 2008 - 2013 Member, Swiss Committee on Space Research, Swiss Academy of Sciences (SAS), Switzerland
- 2008 - 2013 Member, Board of Directors, b-cube AG, Zürich, Switzerland
- 2008 - 2013 Member, Board of Directors, Pearltec AG, Zürich, Switzerland
- 2009 - 2012 Member, International Advisory Committee, Centre for Multi-disciplinary Computer Assisted Tomography at Southampton (CeM-CATS), University of Southampton, UK
- 2010 - 2014 Member, International Advisory Board, Center of Excellence for Osteoporosis Research, King Abdulaziz University, Jeddah, Saudia Arabia
- 2010 - 2011 Member, Evaluation Jury, Architectural Competition for MEDTEC Building (GLC), ETH Zürich, Switzerland
- 2010 - 2011 Co-organizer, Bachelor Program in Health Sciences and Technology, ETH Zürich, Switzerland
- 2010 - 2014 Member, Steering Committee, ETH Phenomics Center, ETH Zürich, Switzerland
- Since 2011 Member, European Institute of Excellence on Tissue Engineering and Regenerative Medicine
- Since 2011 Member, Oversight and Use Committee, Construction of MEDTEC Building (GLC), ETH Zürich, Switzerland
- Since 2011 Member, Center for Applied Biotechnology and Molecular Medicine (CABBM), University of Zürich, Switzerland
- 2012 - 2013 Member, Huiskes Medal Award Committee, European Society of Biomechanics
- 2012 - 2014 Deputy Head, Department of Health Sciences and Technology, ETH Zürich, Switzerland
- 2012 - 2014 Distinguished Adjunct Professor, King Abdulaziz University (KAU), Jeddah, Saudia Arabia
- Since 2013 Head, Laboratory for Bone Biomechanics, ETH Zürich, Switzerland
- Since 2013 Member, Competence Center for Materials and Processes (MaP), ETH Zürich, Switzerland
- Since 2013 Member, Scientific Advisory Board, Centre Suisse d'Electronique et de Microtechnique (CSEM), Neuchâtel, Switzerland
- Since 2013 Board of Directors, International Bone and Mineral Society (IBMS)
- 2014 - 2016 Head, Department of Health Sciences and Technology, ETH Zürich, Switzerland
- Since 2014 Member, Center of Experimental and Clinical Imaging Technologies (EXCITE), ETH Zürich, Switzerland

Since 2015 Member, Advisory Board, Department of BioMedical Engineering, Eindhoven University of Technology, The Netherlands

Since 2013 Board of Directors, International Society of Bone Morphometry (ISBM)

4. Major scientific interest

Dr. Müller has pioneered desktop micro-computed tomography, and quantitative imaging to hierarchically assess skeletal structure-function relationships in tissue regeneration, growth and adaptation. He was the first to measure and analyze 3D bone microstructures in patients in vivo, yielding important information not only on bone structures but also on how they age in humans and the functional consequences of these changes. He later introduced the concept of image-guided failure assessment, which allows the investigation of bone failure behavior using image-based computational tools and validated experimentally using time-lapsed microtomographic imaging. Today, these techniques are successfully employed by researchers and clinicians around the globe for multiscale phenotypic characterization of tissue response in mammalian genetics, systems medicine, mechanobiology as well as tissue engineering and regenerative medicine. He has leveraged his novel technologies to co-found two medical technology start-up companies.

Fields of research interest

- Multiscale Computational Biomechanics and Imaging
- Systems Mechanobiology and Personalized Medicine
- Tissue Engineering and Regeneration

5. Bibliographical Data

Number of publications (ISI): 304; Total citations: 13636 (without self-citations: 12245); H-index: 60
Patents: 1

6. Four references to papers you find most important and relevant

1. Rügsegger P, Koller B, Müller R. A microtomographic system for the nondestructive evaluation of bone architecture. *Calcified Tissue International* 58 (1): 24-29, 1996.
2. Müller R, Van Campenhout H, Van Damme B, Van der Perre G, Dequeker J, Hildebrand T, Rügsegger P. Morphometric analysis of human bone biopsies: a quantitative structural comparison of histological sections and micro-computed tomography. *Bone* 23 (1): 59-66, 1998.
3. Lutolf MP, Weber FE, Schmoekel HG, Schense JC, Kohler T., Müller R, Hubbell JA. Repair of bone defects using synthetic mimetics of collagenous extracellular matrices. *Nature Biotechnology* 21 (5): 513-518, 2003.
4. Bouxsein ML, Boyd SK, Christiansen BA, Guldberg RE, Jepsen KJ, Müller R. Guidelines for assessment of bone microstructure in rodents using micro-computed tomography. *Journal of Bone and Mineral Research* 25 (7): 1468-1486, 2010.

Recognitions:

Honors and awards

- 1993 Alice L. Jee Memorial Award, Twenty-Fourth International Sun Valley Workshop on Hard Tissue Biology, Sun Valley (Idaho), USA
- 1994 SSBE Research Award for the thesis "3D Assessment and Analysis of Trabecular Bone Architecture", Swiss Society for Biomedical Engineering (SSBE)
- 1995 Full-Time Fellowship, Alberta Heritage Foundation (declined)
- 1995 Advanced Researcher Award, Swiss National Science Foundation
- 1996 Scanning Microscopy International Presidential Award, Scanning Microscopy Meeting, Bethesda (Maryland), USA
- 1997 Full-Time Fellowship, Biomedical Engineering Discovery Fund, Center for Engineering in Medicine, Harvard Medical School / The Whitaker Foundation
- 1998 Biomedical Engineering Research Grant, The Whitaker Foundation
- 1999 Inaugural John Haddad Young Investigator Award, American Society for Bone and Mineral Research (ASBMR) and Advances in Mineral Metabolism (AIMM)
- 1999 Promising Young Scientist Award, International Society of Biomechanics (ISB)
- 2000 Inaugural Recipient SNF Professorship, Swiss National Science Foundation
- 2002 Finalist, Mario Boni Award, European Orthopaedic Research Society
- 2003 Plenary Lecturer, 49th Annual Meeting Orthopedic Research Society, New Orleans, USA
- 2004 Young Leader 2004, The American-Swiss Foundation
- 2005 Plenary Lecturer, 27th Annual Meeting of the American Society of Bone and Mineral Research (ASBMR), Nashville, USA
- 2006 Publication Group Award, German Academy of Osteological and Rheumatological Sciences (DAdorW)
- 2007 Most Outstanding Clinical Abstract Award, Australian and New Zealand Bone and Mineral Society
- 2009 Speaker, World Economic Forum (WEF), Davos, Switzerland
- 2012 ESB Clinical Biomechanics Award, European Society of Biomechanics (ESB)
- 2014 Plenary Lecturer, TERMIS-EU 2014 Annual Meeting, Genova, Italy
- 2015 Elected Member, Swiss Academy of Engineering Sciences (SATW)
- 2015 Elected Fellow, European Alliance for Medical and Biological Engineering and Science (EAMBES)
