



# The 4<sup>th</sup> International Workshop on Advanced Ceramics and Technologies for Dentistry

ACT4D 2020

Online, Oct. 9-12, 2020

Workshop Programme



## Program Overview

Oct. 9, 2020

### Featured meeting: Biomimetic materials and bio-inspired processes

Stockholm CEST	Content	Speaker	Beijing BJT
8:25-8:30	Session starts		14:25-14:30
8:30-9:00	<b>3D printing of fibre-reinforced ceramic composites with hierarchical structure (invited)</b>	<b>Shijie Wang</b> A*STAR, Singapore	14:30-15:00
9:00-9:30	<b>Mineralization of collagen in vertebrate tissues in 3D (Invited)</b>	<b>Zhaoyong Zou</b> WHUT, China	15:00-15:30
9:30-9:45	<b>Hierarchical porous Bio-scaffolds for 3D culture of dental pulp stem cells</b>	<b>Bingqing Li</b> PKU, China	15:30-15:45
9:45-10:00	<b>A novel 3D gel printing method convenient for controlling the microstructure of oxide ceramics</b>	<b>Jinyu Guo</b> CSUST, China	15:45-16:00
10:00-10:20	Coffee Break		16:00-16:20
10:20-10:35	<b>Rapid collagen-directed mineralization of calcium fluoride nanocrystals with periodically patterned nanostructure</b>	<b>Weijian Fang</b> WHUT, China	16:20-16:35
10:35-10:50	<b>Bioprocess-inspired preparation of silica with varied morphologies and potential in lithium storage</b>	<b>Fuqiang Wan</b> WHUT, China	16:35-16:50
10:50-11:05	<b>Synthesis of rod-shaped inorganic materials through biotemplating of surface-functionalized bacteria</b>	<b>Hang Ping</b> WHUT, China	16:50-17:05
11:05-11:20	Coffee Break		17:05-17:20
11:20-11:35	<b>Densification mechanism and microstructure of alumina by high-pressure and low temperature sintering</b>	<b>Haiyue Xu</b> WHUT, China	17:20-17:35
11:35-11:50	<b>Sintering highly dense ultra-high temperature ceramics with suppressed grain growth</b>	<b>Junfeng Gu</b> WHUT, China	17:35-17:50
11:50-12:05	<b>Ultra-fast firing: Effect of heating rate on sintering of 3YSZ with and without an electric field</b>	<b>Wei Ji</b> WHUT, China	17:50-18:05
12:05	Session Closes		18:05

Oct. 10, 2020

## Invited Talk Day 1

Stockholm CEST	Content	Speaker	Beijing BJT
8:30	Workshop opens		14:30
8:30-8:40	<b>Opening speech</b>	James Shen	14:30-14:40
8:40-9:10	<b>Zirconia ceramics in contemporary removable prosthodontics</b>	<b>Peter Jevnikar</b> UL, Slovenia	14:40-15:10
9:10-9:40	<b>Optical transmission of ceramics: Theoretical issues and processing consequences</b>	<b>Martin Trunec</b> CEITEC BUT Czech Republic	15:10-15:40
9:40-10:00	Coffee break		15:40-16:00
10:00-10:30	<b>Lithium disilicate glass-ceramics: Materials basics and clinical performance</b>	<b>Saifang Huang</b> JUST, China	16:00-16:30
10:30-11:10	<b>Different connective concepts of ceramic dental implants and clinical use</b>	<b>Jens Tartsch</b> ESCI, Switzerland	16:30-17:10
11:10-11:40	<b>Digital dentistry - modern frontier equipped with versatility for an effective ceramic implant placement</b>	<b>Saurabh Gupta</b> WhiteZ Dental, India	17:10-17:40 Bangalore time: 14:40- 15:10
Lunch/Dinner			
14:00-14:30	<b>Titanium for dental implants. Is this the end of the road for this metal?</b>	<b>Georgios E. Romanos</b> Stonybrook, USA	20:00-20:30 New York Time: 8:00- 8:30
14:30-15:00	<b>Additive manufacturing of zirconia: Where we are and what are the potentials?</b>	<b>Amirali Zandinejad</b> Texas A&M, USA	20:30-21:00 Texas Time 7:30-8:00
15:00-15:40	<b>How does digital workflow help communication between dentist and patient?</b>	<b>Ankido De Basso</b> Svea Tandvard, Sweden	21:00-21:40
15:40-16:10	<b>Digitizing dentistry: Lecture on the massive improvements in production tolerance due to digital procedures in dentistry</b>	<b>Michael Braian</b> Baltzar Tandvard, Sweden	21:40-22:10
16:10-16:30	<b>Swedish Academy of Ceramic Odontology: A platform for open innovation</b>	<b>Noran De Basso</b> Svea Tandklinik, Sweden	22:10-22:30
16:30	Session closes		22:30

Oct. 11, 2020

## Invited Talk Day 2

Stockholm CEST	Content	Speaker	Beijing BJT
8:30	Session starts		14:30
8:30-9:00	<b>Achieving strong and tough 3D-printed ceramics: challenges in defect-tolerant materials and process optimization</b>	<b>Jérôme Chevalier</b> INSA-Lyon, France	14:30-15:00
9:00-9:30	<b>Application of digital workflow in implant-supported restorative dentistry</b>	<b>Zhe Wu</b> GMU, China	15:00-15:30
9:30-10:00	<b>Dental digital eco-systems and their improvement of clinical efficiency and patient satisfaction</b>	<b>Jan Paulics</b> 3Shape, Denmark	15:30-16:00
10:00-10:30	Coffee break		16:00-16:30
10:30-11:00	<b>Some AI technologies in dental design</b>	<b>James Tsoi</b> HKU, Hongkong (China)	16:30-17:00
11:00-11:30	<b>The future of clinical dentistry using 3D technology</b>	<b>Ayush Bagla</b> Ackuretta, Taiwan (China)	17:00-17:30
11:30-12:00	<b>Application of digital twin in additive manufacturing of ceramic components</b>	<b>Qingfeng Zeng</b> NWPU, China	17:30-18:00
Lunch/Dinner			
14:00-14:30	<b>Multi-material lithography-based ceramic manufacturing as tool for the full digital workflow for the production of dental applications</b>	<b>Daniel Bomze</b> Lithoz, Austria	20:00-20:30
14:30-15:00	<b>Additive manufacturing of zirconia ceramics for dental applications</b>	<b>Erik Adolfsson</b> RISE, Sweden	20:30-21:00
15:00-15:30	<b>Fabrication of additive manufactured bioceramic / metal cranioplasty implants</b>	<b>Håkan Engqvist</b> UU, Sweden	21:00-21:30
15:30-16:00	<b>Zirconia dentistry</b>	<b>James Zhijian Shen</b> SU, Sweden	21:30-22:00
16:00	Session closes		22:00

Oct. 12, 2020

## Oral Presentation Competition

Stockholm CEST	Content	Speaker	Beijing BJT
8:30	Session starts		14:30
8:30-8:45	<b>Impact of polishing speed on the color stability, gloss, and roughness of monolithic zirconia</b>	<b>Wei Jiang</b> GXMU, China	14:30-14:45
8:45-9:00	<b>Marginal and internal fit of self-glazed zirconia onlays by using conventional and digital impressions in vitro</b>	<b>Yihong Liu</b> PKU, China	14:45-15:00
9:00-9:15	<b>Additively manufactured zirconia ceramics for dental prostheses: solved problems and remaining obstacles</b>	<b>Hezhen Li</b> THU, China	15:00-15:15
9:15-9:30	<b>Synergistic effect of alumina and silica doping facilitating ageing resistant and tough 3Y-TZP bioceramics</b>	<b>Maja Antanasova</b> JSI, Slovenia	15:15-15:30
9:30-9:45	Coffee break		15:30-15:45
9:45-10:00	<b>Enhanced translucency and flexural strength of zirconia dental ceramics due to refined manufacturing process</b>	<b>Jaroslav Kastyl</b> CEITEC, Czech	15:45-16:00
10:00-10:15	<b>Clinical adjustment evaluation of monolithic zirconia crown made through an easy-to-use full digital workflow</b>	<b>Lifang Wu</b> ZCMU, China	16:00-16:15
10:15-10:30	<b>Effect of techniques for screw access hole preparation on fracture load of implant-supported monolithic zirconia single crown</b>	<b>Hongbo Zhou</b> CSU, China	16:15-16:30
10:30-10:45	<b>Dimensional accuracy and margin quality of self-glazed zirconia crowns with different finish line designs</b>	<b>Rong Li</b> PKU, China	16:30-16:45
10:45-11:00	Coffee break		16:45-17:00
11:00-11:15	<b>Effect of nano-structured alumina coating on the resin-zirconia bond strength in “in vivo” and “in vitro” conditions</b>	<b>Tine Majgal</b> UL, Slovenia	17:00-17:15
11:15-11:30	<b>Construction of virtual intercusp occlusion: considering teeth displacement</b>	<b>Linlin Li</b> PKU, China	17:15-17:30
11:30-11:45	<b>Bioprocess-inspired microscale additive manufacturing of multilayered TiO<sub>2</sub>/polymer composites with enamel-like structures and high mechanical properties</b>	<b>Jingjiang Wei</b> WHUT, China	17:30-17:45
11:45-12:00	Closing speech and prize presentation		17:45-18:00
12:00	Workshop closes		18:00

## Welcome to the 4<sup>th</sup> International Workshop on Advanced Ceramics and Technologies for Dentistry (ACT4D 2020), online on Oct. 9-12, 2020

The workshop was initiated in 2011, in Stockholm, Sweden, followed by a second one in 2017, in Budapest, Hungary and third one in 2019, in Stockholm, Sweden. All were supported by the European Ceramic Society. The aim was to provide a forum for multidisciplinary brainstorm and discussions between ceramists, engineers and clinicians devoted to dentistry with the focus on challenges encountered by the current and the emerging technologies, as well as future concepts going beyond the state of the art.

Since the 3<sup>rd</sup> meeting the scope of the workshop has been broadened by involving topics of **advanced ceramics** and relevant **advanced technologies**. In this way, we aim at integrating more complementary knowledge and skills together with cross-disciplinary actions on the synergy of fundamental research and needs-driven exploration of advanced ceramics and technologies timely demanded for dentistry. The workshop traditionally seek the works related to *i*) the development and customized manufacturing of novel advanced ceramics with improved properties, *ii*) the fundamental understanding of the interactions between ceramics (on the micro-to-nanoscale level) and hard-to-soft tissues (on protein and cell level), *iii*) the reliability of ceramic parts in relation to their hierarchical microstructures and of the feasibility of fitting the ceramic processes into a full digital clinic approach. Besides, what has been covered since the 3<sup>rd</sup> workshop is the newly quoted works on *iv*) advanced technologies that will enable the establishment of an ecosystem based on model-free digital workflows.

The theme of “**Net-shape digital manufacture of customized zirconia parts beyond the state-of-the-art**” will be particularly emphasized in this 4<sup>th</sup> workshop. Selected papers will be published in a special issue of the Journal “*Advances in Applied Ceramics*” in 2021.

The workshop will be organized jointly by Stockholm Material Hub, Swedish Ceramic Society and Zircosol AB, and partially sponsored by the European Regional Development Fund.

**Zhijian James Shen**

Chair of ACT4D 2020

Professor, Department of Materials and Environmental Chemistry, Stockholm University

Director, Stockholm Material Hub

## Committee

### Chair

Zhijian James Shen, Stockholm University, Sweden

### Local Organizing Committee

Prof. James Zhijian Shen, Stockholm University, Sweden

Dr. Erik Adolfsson, RISE, Sweden

Prof. Håkan Engqvist, Uppsala University, Sweden

Dr. Per Tidehag, Jönköping University, Sweden

Dr. Mirva Eriksson, Stockholm University, Sweden

Dr. Lu Song, Stockholm University, Sweden

### Invited Speaker

#### Section I: Zirconia Dentistry

Prof. Jérôme Chevalier, INSA of Lyon, France

Prof. Peter Jevnikar, University of Ljubljana, Slovenia

Prof. Martin Trunec, CEUTEC BUT, Brno University of Technology, Czech Republic

Prof. Saifang Huang, University of Auckland, New Zealand

Prof. Georgios E. Romanos, Stonybrook University, USA

Prof. James Zhijian Shen, Stockholm University, Sweden

#### Section II: Clinical Digital Workflow

Dr. Jens Tartsch, European Society for Ceramic Implantology (ESCI), Switzerland

Dr. Michael Braian, Baltzar Tandvård, Sweden

Dr. Ankido De Basso, Svea Tandvård, Sweden

Prof. Zhe Wu, Guangzhou Medical University, China

Dr. Saurabh Gupta, WhiteZ Dental, India

Dr. Jan Paulics, 3Shape, Denmark

#### Section III: Digital Net-Shape Manufacturing

Dr. James Tsoi, The University of Hong Kong, Hongkong SAR, China

Dr. Erik Adolfsson, RISE IVF, Sweden

Prof. Håkan Engqvist, Uppsala University, Sweden

Dr. Daniel Bomze, Lithoz GmbH, Austria

Mr. Ayush Bagla, Ackuretta, Taiwan, China

Prof. Qingfeng Zeng, Northwestern Polytechnical University, China

Prof. Amirali Zandinejad, Texas A&M University, USA

#### Section IV: Biomimetic Materials and Bio-inspired Processes

Prof. Zhaoyong Zou, Wuhan University of Technology, China

Dr. Shijie Wang, IMRE A\*STAR, Singapore

#### Section V: Collaboration in Dentistry

Dr. Noran De Basso, Svea Tandklinik, Sweden

#### Scientific Committee

Prof. Jérôme Chevalier, INSA of Lyon, France

Dr. Erik Adolfsson, Swerea IVF, Sweden

Prof. Hailan Feng, Peking University, China

Prof. Peter Jevnikar, University of Ljubljana, Slovenia

Prof. Corrado Piconi, Catholic University of the Sacred Heart, Italy

Prof. Kwok-Hung (Albert) Chung, University of Washington, USA

Prof. Georgios E. Romanos, Stony Brook University, USA

Dr. Jens Tartsch, European Society for Ceramic Implantology, Switzerland

Prof. Ralf Kohal, University of Freiburg, Germany

Prof. James Zhijian Shen, Stockholm University, Sweden



## The online meeting platform: VooV Meeting

### Short summary of user guide

#### **For speakers having their talks in the upcoming session:**

1. Download “VooV Meeting”
2. Sign in via verification code/password/wechat
3. Click on the invitation link in email/enter Meeting ID, enter your real name, click “join meeting” and wait host to invite you into meeting room.
4. The host would designate you as co-host during your session.
5. When it’s time for you to start your talk, you can unmute yourself/be unmuted by the host, start screen sharing and going on with your talk and discussion.
6. After your talk, please mute your microphone again. If you want to join discussion of others’ talks, unmute yourself/be unmuted by the host first.

#### **For other attendees (including speakers not having their talks in the upcoming session)**

1. Download “VooV Meeting”
2. Sign in via verification code/password/wechat
3. Click on the invitation link in email/enter Meeting ID, enter your real name, click “join meeting” and wait host to invite you into meeting room. Your microphone would be muted by the host, and you can’t share your screen either.
4. If you want to join discussion of others’ talks, click “unmute”, then send the request to “unmute” to the host, the host would introduce you to others first and unmute you, then you can start with your question. After that, mute your microphone again.

For more details, please refer to [“Quick guide to VooV Meeting”](#) that local organizing committee sent to all participants.