

## **Arts J.J.C. Curriculum Vitae Distinguished Lorentz Fellowship Date: 21-10-2021**

### **Personal details:**

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the Netherlands  
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Date & place of birth: 07-11-1973, Oss, the Netherlands  
Nationality: Dutch  
Gender: Male



### **Selected education:**

BKO, 01-02-2014, Basis Kwalificatie Onderwijs (BKO-EVC), Maastricht University  
PhD, 06-04-2006, Radboud UMC, Nijmegen, the Netherlands  
MSc, 31-05-2000, Human Movement Sciences, Maastricht University  
BSc, 03-11-1997, Physiotherapy, Hogeschool Enschede

### **Professional appointments:**

Associate Professor Translational Biomaterials (0,8 fte, 2008-2021)  
Department Orthopaedic Surgery, School for Public Health and Primary Care: CAPHRI  
Maastricht University/Maastricht University Medical Centre+ (MUMC+)

Associate Professor Translational Biomaterials (0,2 fte, 2009-2021)  
Faculty Biomedical Engineering, Department Orthopaedic biomechanics  
Eindhoven University of Technology (TU/e)

### **Selected Memberships of civil society advisory bodies**

2019- ; Chairmen Research Interest Group Musculoskeletal Infection Orthopaedic Research Society (ORS). With this team, we create awareness of infection incidence and antimicrobial resistance and we organize symposia and prepare educational materials for all ORS members.

2017- ; Member European Union workgroup Societal Impact of Pain (SIP) on behalf of the EFORT Society. Request the European council to address pain as a health indicator by implementing the International Classification of Diseases 11th Revision (ICD-11) and ICF with chronic pain as a transdiagnostic and self-contained topic for pilot projects with scientific monitoring. I was part of the team that compiled the SIP policy document and the implementation in ICD-11.

2014-2017; Member workgroup Project Cost effectiveness in Medical treatment guidelines (Kosteneffectiviteit in Richtlijnen) for Kennisinstituut Federatie Medisch Specialisten on behalf of Dutch Orthopaedic Association (NOV). In this committee, a standard way of including cost-effectiveness in guidelines was developed.

### **Publications 2004-2021**\_(list 10 selected publications added to CV as separate file)

90 published translational biomaterials research papers: infection (28), bone (38), spine (20)  
2 books and 6 book chapters

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### **Selected grants bridging science disciplines**

2021; NWA DARTBAC;

- Develop material technology against antimicrobial resistance and launch a national awareness AMR campaign for general public and health care professionals
- 11.3M euro, 22 PhD - 2 PD - 2 labtech, 24 partners, 6 years

2016; InSciTe Posture;

- Develop new surgical technique for scoliosis based on new material technology that allows longitudinal growth of spine without the need for multiple revision surgeries
- 4.8M euro, 3 PhD - 2 PD, 5 partners, 5 years

2016; Interreg Prosperos;

- Develop 3D printed personalized implants to achieve better bone fixation and less change on infection. Quicker rehabilitation through better fit for vital aging and preservation of mobility
- 4.7M euro, 10 PhD – 2 PD - 1 labtech, 13 partners, 4 years

2009; BMM Spineguide;

- Material technology development for a new surgical scoliosis treatment
- 1.9M euro, 3 PhD - 1 PD, 4 partners, 4 years

2009-2020; 1M - 1.2M euro to perform pre-clinical and clinical research studies for pharmaceutical and medical device industry companies.

### **Selected awards and honors**

01-2016; Special recognition award International Combined Orthopaedic Research Societies

05-2012; Göran Bauer's grant by the Nordic Orthopaedic Federation

### **Selected invited talks**

2020: Arts JJ. (invited speaker) Musculoskeletal infection. Orthopaedic Research Society, Phoenix, USA

2019: Arts JJ. Keynote Lecture: Antimicrobial therapy; From Antibiotics towards new treatment technologies. 5<sup>th</sup> ESTROT congress May 6-8, Malaga, Spain

Arts JJ. Biomaterials in spinal fusion (invited keynote lecture) Global spine 2019 May 15-18, Toronto Canada

### **Selected societal impact & media exposure**

- 13-04-2021 Eindhoven Innovation Café Antimicrobial resistance.  
[https://www.linkedin.com/posts/ehv-innovation-cafe\\_antimicrobial-resistance-amr-is-an-emerging-activity-6787660675918393344-SYDF](https://www.linkedin.com/posts/ehv-innovation-cafe_antimicrobial-resistance-amr-is-an-emerging-activity-6787660675918393344-SYDF)
- 17-10-2020: Interreg Prosperos project video by Limburg Province.  
NL: <https://vimeo.com/472664434/0d2c8a0703>
- 26-01-2016: TV RTL nieuws: Hoe 3D-prints de medische wereld veroveren.  
<https://www.rtlnieuws.nl/economie/artikel/695866/ho-3d-prints-de-medische-wereld-veroveren>

### **Education at Maastricht UMC+ and Eindhoven University of Technology**

Involved in execution, development and coordination of education (0.23 fte) within several faculties. Additionally, I also take part in postdoctoral education tasks mainly on biomaterials for which I develop the content myself.

Taken together the development, coordination and teaching on clinical implementation of biomaterials for the Dutch Orthopaedic Association and various other medical societies on biomaterials and the maintenance and expansion of the content on the TOBIG website. In 2019, I published a book on "Calcium-phosphate biomaterials for bone healing; a practical guideline for implementation in clinical practice". ISBN 978-908-29-0160-3 that is implemented in education at NOV, EFORT, ESTROT and ISASS societies. As of 2017, I have initiated the TOBIG (Translational Orthopaedic Biomaterials Interest Group) platform providing a solution for a growing need of interaction between, material scientists, clinical researchers and clinicians on the development, testing and clinical implementation of biomaterials.

[www.tobig.eu](http://www.tobig.eu)

### **Translational research at Maastricht UMC+ and Eindhoven University of Technology**

Since 2012, I'm the coordinator of the translational biomaterials research line. The research focusses on application of biomaterials for infection prevention and treatment, large bone defect healing, and spinal deformity treatment both at MUMC+ and TU/e.

My translational research connects material technology with implant design, biological and mechanical properties, animal studies and ultimately the clinical implementation. With this role I fill a bridging function between MUMC+, TU/e, DSM and other industry and academic partners. Under my supervision, I currently guide 13 PhD students. To appropriately conduct this research, high resolution imaging of bone density and bone microarchitecture (HRpCT) and imaging of the physiological processes associated with bone healing (PET-CT and PET-

MRI) are essential and my part-time appointment as lecturer/scientist at Eindhoven University of Technology offers great opportunities to have adequate support in image analysis and validation. Furthermore, the TU/e affiliation makes inclusion of Finite Element Analysis (FEA) to our research possible and thereby strengthens our group and widens our research possibilities.

It is one of my demonstrated key competences to be able to bring together new multidisciplinary and interdisciplinary consortia of academic and industrial partners thereby bridging scientific disciplines. Clinical impact but also societal impact is always a necessity in new grant proposals within these consortia.

#### **Biomaterials for infection prevention and treatment:**

Primary aims: Assessment safety and efficacy antimicrobial coatings in in vitro and in vivo animal models and elucidate biofilm formation on implant materials using molecular imaging. Furthermore, assess clinical efficacy and safety of for one-stage osteomyelitis treatment in clinical studies. Antimicrobial resistance (AMR) awareness and AMR information campaign are set up in active collaboration with academic and industry partners in both technical and social sciences in the NWA DARTBAC consortium. We also aim to achieve behavioural changes that will diminish the impact of AMR in the Dutch society

Infection research has two distinct lines. First, research on mechanical performance and biological efficacy and safety in animal models of newly develop biomaterials / coating technology for infection treatment is studied in multidisciplinary teams like Biomedical Materials Nantico and NWA DARTBAC. In this project we developed, used and validated two animal infection models with state-of-the-art imaging and extensive follow-up. Secondly, the translation towards clinical use and further assessment of efficacy and safety on these newly developed technologies in patients is studied. Additionally, in collaboration with M4I (prof Maarten Honing) we visualize biofilm formation in vivo. The interdisciplinary NWA-ORC DARTBAC consortium is a direct result of this collaboration. Bioactive glass is a new biomaterial technology to eradicate infection with great promise that we currently investigate in mechanical, biological and clinical projects at TU/e-MUMC+ research group. MUMC+ is currently leading the Dutch user group and patient registry. At TU/e research focus lays within mechanical properties as well as setup of bioreactor models to study cell-bacteria-biomaterial interaction.

#### **Selected internal, national and international collaborations**

Biomaterials for infection prevention and treatment:

- MUMC+: Dept Traumatology, Dept Medical Microbiology, Dept Radiology & Nuclear Medicine, M4i, Dept Health Promotion, animal facility
- National academic: Amsterdam UMC (Dr Bas Zaat), Leiden UMC (Prof Nelissen), RIVM, TU Delft (Prof Zadpoor), TU/e Eindhoven (Prof Dankers), UMC Groningen (Prof Jutte), UMC Utrecht (Prof Weinans), University of Amsterdam (Dr de Bruijn)
- National industry: Cambioceramics, DSM Biomedical, OS-1
- International academic: AO Research Institute (Prof Richards), University Heidelberg (Prof Schmidmaier), University Helsinki (Prof Lindfors), University Milano (Prof Romano), University Rochester (Prof Schwartz), USISR (Dr Joshua Wenke)
- International industry: B-Braun Aesculap, Bonalive, DSM Biomedical, Depuy J&J, Heraeus

#### **Research activities medical device industry: 3 man-years**

During 2005-2008 I was a clinical research manager for Stryker (a global medical device company) in their European Office. In this role, I shared direct line management (7 fte) and budget (4.7M€) responsibilities. Educated and in function as European specialist on joint replacement and tribology with an in-company role on biomaterials development. In this role, I worked closely together with other European and USA based clinical research teams. In my own opinion it is a strength to have worked both in the medical device as well as academic research positions. This experience enables me in building interdisciplinary consortiums now and in the future, allowing good management of expectations from both an industrial and academic partners.