



Jakob Welner

Hybrid Engineer: Biomedical,
Animation & Robotics

R&D

Bio-Inspired Control

Character Animation

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About Me

My mindset is R&D through a mixed background of arts, biology and engineering where I often reach beyond my curriculum for solving interdisciplinary challenges. Through 8+ years of professional experience my broad know-how has repeatedly been a valuable asset, both as a specialist and for communicating between departments, sparring with experts and developing holistic solutions across many fields.

I have successfully applied my proficiencies for: designing motion and gestures for creating empathetic and appealing robots, developing and building interactive robot prototypes, developing behaviour for hero characters on Hollywood movies at Oscar-winning animation companies, software R&D and implementation of streamlined digital workflow at various production companies, understanding and translating customer needs into concrete products and consulting for product development of an inertia-based motion capture suit.

I have participated in several award winning projects including a novel soft-robotic exoskeleton based on my own idea, a Carlsberg commercial winning Commercial of the Year in Denmark, as well as being featured both as a software developer of an Open Source toolbox that I created for Autodesk Maya and as artist on a high-ranking website for animation artist portfolios.

I am passionate about robotic behaviour, interaction and appeal, a sustainable future and healthcare systems through the lens of behavioural sciences, arts and engineering.

My skills further extend to a deep specialization in 2 key areas:

- Bio-Inspired robotics (6 yrs): Combining biomechanics and neuroscience with mechanics, electronics and control engineering
- Character animation (8 yrs): Leading an audience through a story, understanding human empathy and attention and creating appealing behaviour

Experience

R&D: Robot Prototype Development

SYBO Games February 2016 to April 2016



- ▶ Full responsibility, idea and R&D. Developed a robot game prototype featuring an interactive powered biped passive-walker. Mobile BLE control.
- ▶ 2,5 months from idea to walking robot
- ▶ Constructed from LEGO technic, 3D printed parts, CoolMorph, latex and various electronics. Arduino-based.
- ▶ 4 DoF total: 2 DoF actuation

R&D: Unity App for Robot Face

Shape Robotics March 2017 to March 2018



- ▶ Full responsibility of design and development of mobile app serving as the face of the FABLE robot. v1.0 and v2.0
- ▶ Featuring a programmable articulated face with 2 reactive eyes, eyelids and eyebrows.

R&D: Software Development

Various Companies January 2007 to May 2012



- ▶ Pipeline Development at Duckling, M2Film, and BaconX: Design & implementation of IT backbone - version control, data integrity, approval process, step-automation and GUI
- ▶ Workflow and Tools R&D at various companies: Workflow optimisation/automation, GUI and process development, design of novel tools

R&D: Smartsuit Technology Consultant

Rokoko September 2014 to December 2014



- ▶ R&D of constrained indoor positioning system for the Smartsuit Pro - an inertia-based motioncapture suit
- ▶ Consulting for User-Experience and workflow integration in animation pipeline

Skills

Personal Strengths

- ▶ Curious & Interested
- ▶ Resourceful
- ▶ Independent
- ▶ Multidisciplinary

Technical Strengths

- ▶ R&D and Prototyping
- ▶ Control Engineering
- ▶ Python, C, C++, Matlab
- ▶ CAD Design
- ▶ Manufacturing / Assembly
- ▶ Physiological Motor Control
- ▶ Life Science
- ▶ Dynamical Systems
- ▶ Embedded Systems
- ▶ Living Systems / Biology
- ▶ Biomedical Product Development
- ▶ CE and FDA processes

Artistic Strengths

- ▶ Character Animation
- ▶ Classical Drawing
- ▶ Sculpting / Modeling
- ▶ Music (Percussion)

Communication / Teaching

Various Companies/Schools 2011 to 2013



- ▶ Masterclass in Python Programming for Artists at The Animation Workshop: 2 days of teaching the basics of using Python in an artistic context
- ▶ Guest teacher in Animation at TRUEMAX Academy: Teaching animation principles, mindset and approach to animation, 2 months.
- ▶ Animation & Story Consultant at Nørgaard & Mikkelsen - Helped develop story of advertisement while facilitating communication between agency and animation studio. Sporadic consulting throughout 2 years of production
- ▶ General inter-department communications between technical & artistic employees at various companies

Character Animation

Various November 2004 to May 2015



- ▶ Animation Supervisor at: BaconX, Copenhagen - Magnum (icecream brand) worldwide campaign movie "Release the Beast"
- ▶ Animator at: Animal Logic, Sydney - Animated Feature film "Legend of the Guardians" directed by Zach Snyder
- ▶ Animator at: Double Negative, London - Disney Produced VFX Feature Film "John Carter" directed by Andrew Stanton
- ▶ Animator at: Duckling A/S, Copenhagen - Carlsberg Sport Advertisements: Squirrel and Penguin (Award Winner)
- ▶ Animator at: Various other companies for smaller jobs

:: Further Projects ::

Various Since 2002

- ▶ Master's Thesis: Bio-Inspired Robotic Controller with virtual muscles and Cerebellum control. Part of the Neurorobotics subgroup of The Human Brain Project - Ongoing (Finishes September 2018)
- ▶ Bachelor Thesis: Musculoskeletal Predictive Control of Human Locomotion - Simulation-based project using cost-of-transport minimisation
- ▶ University Project: Soft-Robotic Prosthesis for Shoulder Flexion - Designed for re-enabling my grandmother after a fall caused her to lose shoulder flexion mobility
- ▶ University Project: Animatronic Design for Additive Manufacturing - Exploration of functional embedded mechanics for animatronics design using 3D printing.
- ▶ Personal Project: [OMToolbox] Founder of the Open Maya Toolbox, an open source initiative for extending the digital sculpting capabilities of Autodesk Maya. Featured on the official Maya website.
- ▶ Personal Project: [PAIE] Python Animation Import/Export. Open source tool for handling animation libraries in Autodesk Maya. Now used worldwide in various animation and games studios
- ▶ Personal Project: Dynamixel-Maya Connection. Python-based service for controlling Robotis Dynamixel servos from Autodesk Maya, allowing to run live animation playback on a robot.

Education

M.Sc Biomedical Engineering

Technical University of Denmark September 2016 to September 2018

bio-inspired motor control, advanced linear control design, biomechanics, biomedical product development, CE / FDA standards, physiological modelling

M.Sc Biomedical Engineering - Erasmus+

Politecnico Di Milano September 2017 to January 2018

Neuroengineering, Systems Theory, E-Health Methods & Technologies

B.Sc Mechanical Engineering

Technical University of Denmark September 2012 to February 2016

strength of materials, embedded systems, manufacturing, machining and engineering design / problem solving